



88004822

88004822  
QE  
75  
.065  
no. 82-966  
UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

BLM Library  
D-553A, Building 50  
Denver Federal Center  
P. O. Box 25047  
Denver, CO 80225-0047

RESULTS OF USGS OIL-SHALE CORE DRILLING IN THE EASTERN UINTA  
BASIN, UTAH: Coyote Wash-1 Drill Hole

By

Richard W. Scott, Jr., and Michael P. Pantea

**OIL SHALE OFFICE  
CENTRAL LIBRARY**

Open-File Report 82-966

1982

QE  
75  
.065  
no.  
82-966

This report is preliminary and has not  
been reviewed for conformity with  
U.S. Geological Survey editorial  
standards and nomenclature.



#9087976

ID: 88004822

QE  
75  
.065  
no.  
82-966

CONTENTS

	Page
Introduction-----	1
Location-----	1
Drilling notes-----	1
Water quality data-----	4
Cuttings lithology-----	5
Core lithology-----	12
Oil yield bar graphs-----	52
Nahcolite occurrence-----	58





## ILLUSTRATIONS

Page

Figure 1. Index map of a part of Uintah County, Utah showing the location of drill site CW-1-----	2
2. Oil-yield bar graph for the CW-1 drill hole from Fischer assay analysis (1 inch = 100 feet)-----	52
3. Detailed oil-yield bar graph for the CW-1 drill hole from Fischer assay analysis (1 inch = 20 feet)-----	53

## Tables

Page

Table 1. Water quality data for the Birdsnest aquifer zone in the CW-1 drill hole-----	4
--	---





RESULTS OF USGS OIL-SHALE CORE DRILLING IN THE EASTERN UINTA  
BASIN, UTAH: Coyote Wash-1 Drill Hole

by

Richard W. Scott, Jr., and Michael P. Pantea

INTRODUCTION

Two oil-shale core holes were drilled in the eastern Uinta Basin, Utah, by the U.S. Geological Survey (USGS) during the fall and winter of 1981-1982. These holes were drilled for the purpose of oil-shale resource evaluation in the presumed depositional center of the rich oil-shale sequence in the basin.

The drilling operations were contracted by the U.S. Geological Survey to Connors Drilling, Inc. of Lakewood, Colorado, and the field descriptions of the cuttings and core were done by Ameralda Resources, Inc. of Denver, Colorado, with revisions by the USGS. Geophysical logging was done by BPB, Inc. of Grand Junction, Colorado, and the Fischer assay analysis of the core was performed by Dickinson Laboratories, Inc. of El Paso, Texas.

The water quality data were made available by Walt Holmes and Mike Enright of the USGS in Salt Lake City, Utah.

Future work with the core material from the Coyote Wash-1 (CW-1) drill hole includes analysis of a composite standard sample of oil shale from the Mahogany oil-shale zone (which, in this hole, includes material from 2,195.0 feet deep to 2,323.0 feet deep) for major, minor, and trace elements. The core material is stored at the USGS core storage facility in Arvada, Colorado.

The authors would like to thank W. B. Cashion, M. C. Smith, J. K. Pitman, C. J. Buntenbah, A. M. Schack, and L. P. Williams for their help in preparing this report.

LOCATION

The Coyote Wash-1 drill hole is located in the eastern part of the Uinta Basin, Utah in SE 1/4 SE 1/4 NE 1/4 sec. 22, T. 9 S., R. 23 E., Salt Lake Prime Meridian (see fig. 1). The hole was drilled on an existing pad to minimize the environmental impact of the drilling operations. The CW-1 location is approximately 8.4 miles west of the town of Bonanza, Utah.

DRILLING NOTES

The rotary section of the CW-1 hole was drilled with a 1981 Portadrill TKT Prospector truck-mounted rig.<sup>1/</sup> The cored interval was drilled with NC wireline equipment using both 10 and 20 foot core barrels and the Portadrill and a Longyear 44 hydraulic drill rig. Drilling fluids used were high pressure air mist and foam for the upper part of the hole and a saline mud circulation system for the cored interval.

---

<sup>1/</sup>Use of brand names in this report is for descriptive purposes only and does not constitute endorsement by the U.S. Geological Survey.

RESULTS OF 1982 OIL-SHALE CORE DRILLING IN THE EASTERN UTAH BASIN, UTAH: Coyote Wash-1 Drill Hole

by  
Richard W. Seay, Jr., and Michael P. Paster

INTRODUCTION

The oil-shale core holes were drilled in the eastern Utah Basin, Utah, by the U.S. Geological Survey (USGS) during the fall and winter of 1981-1982. These holes were drilled for the purpose of oil-shale resource evaluation in the presumed depositional center of the rich oil-shale sequence in the basin.

The drilling operations were conducted by the U.S. Geological Survey to the University of Utah, Inc., of Salt Lake City, Utah, and the field descriptions of the core were done by the University of Utah, Inc., of Salt Lake City, Utah. The lithological logging was done by the University of Utah, Inc., of Salt Lake City, Utah, and the Fisher assay analysis of the core was performed by Dickinson Laboratories, Inc. of El Paso, Texas.

The water quality data were made available by Kate Holmes and Mike Enright of the USGS in Salt Lake City, Utah.

Further work with the core material from the Coyote Wash-1 (CW-1) drill hole includes analysis of a composite standard sample of oil shale from the Homogenized oil-shale zone (HOSZ) in this hole, includes material from 2,195.0 feet deep to 2,195.0 feet deep for major, minor, and trace elements. The core material is stored at the USGS core storage facility in Arvada, Colorado.

The authors would like to thank W. B. Coston, W. C. Smith, J. K. Pittman, C. J. Swenson, A. R. Schack, and L. P. Williams for their help in preparing this report.

LOCATION

The Coyote Wash-1 (CW-1) hole is located in the eastern part of the Utah Basin, Utah, in SE 1/4 of NE 1/4 sec. 22, T. 32 S., R. 23 E., Salt Lake Prime Meridian (see Fig. 1). The hole was drilled on an existing pad to include the environmental impact of the drilling operations. The CW-1 location is approximately 8.5 miles west of the town of Bonanza, Utah.

DRILLING NOTES

The rotary section of the CW-1 hole was drilled with a 1981 Foster-711 TFL Prospector truck-mounted rig. The cased interval was drilled with an electric equipment using 3 1/2 inch and 50 foot core barrels and the Foster-711 and a longwall 24 hydraulic drill rig. Drilling fluids used were high pressure air mist and foam for the upper part of the hole and a saline mud circulation system for the cased interval.

Use of brand names in this report is for descriptive purposes only and does not constitute endorsement by the U.S. Geological Survey.





Figure 1. Index map of a part of Uintah County, Utah, showing the location of drill site CW-1.





The hole was spudded in the Tertiary Uinta Formation, and both the Uinta and Green River Formations contained minor amounts of gas below depths of about 1,500 feet. No high-pressure gas pockets were encountered during the drilling operations, but such occurrences are known throughout the Chapita Wells gas field in which this hole is located.

The Birdsnest aquifer of the Parachute Creek Member of the Green River Formation was encountered at a depth of 1,739 feet in the CW-1 hole. This vuggy zone produced water at a rate estimated to be about 700 gallons per minute (see table 1, water quality data for the Birdsnest aquifer zone in the CW-1 drill hole). This water-producing zone was about 65 feet thick. The hole was cased with 5-inch casing to a depth of 1,817 feet for hydrologic monitoring. The casing was not perforated.

Boron, dissolved	180,000	mg/l
Calcium, dissolved	1.0	mg/l
Chloride, dissolved	3,100	mg/l
Fluoride, dissolved	26	mg/l
Iron, dissolved	320	mg/l
Magnesium, dissolved	1.0	mg/l
Manganese, dissolved	26	mg/l
Nitrate, total	less than 0.05	mg/l
Phosphorus, dissolved	0.0	mg/l
Potassium, dissolved	39	mg/l
Silica, dissolved	less than 2	mg/l
Sodium, dissolved	34,800	mg/l
Sulfate, dissolved	7,400	mg/l
Alkalinity, as CaCO <sub>3</sub>	79,300	mg/l
pH, field	9.5	
Specific conductance, laboratory	84,000	umhos
Specific conductance, field	100,000	umhos
Water temperature, field	26	degrees C
Sample taken at a depth of 1746 feet		

Water analysis by U.S. Geological Survey W.R.B. Central  
Laboratory, Denver, Colorado. Lab ID: 1288602





TABLE 1: Water quality data  
for the Birdsnest aquifer, CW-1 drill hole

Boron, dissolved	180,000	ug/l
Calcium, dissolved	3.0	mg/l
Chloride, dissolved	3,100	mg/l
Fluoride, dissolved	26	mg/l
Iron, dissolved	320	ug/l
Magnesium, dissolved	1.0	mg/l
Manganese, dissolved	20	ug/l
Nitrate, total dissolved	less than 0.09	mg/l
Phosphorus, dissolved	8.0	mg/l
Potassium, dissolved	39	mg/l
Silica, dissolved	less than 2	mg/l
Sodium, dissolved	34,000	mg/l
Sulfate, dissolved	7,400	mg/l
Alkalinity, as CaCO <sub>3</sub>	79,300	mg/l
pH, field	9.5	
Specific conductance, laboratory	64,000	umhos
Specific conductance, field	100,000	umhos
Water temperature, field	26	degrees C
Sample taken at a depth of 1746 feet		

Water analysis by U.S. Geological Survey W.R.D. Central  
Laboratory, Denver, Colorado. Lab ID: 1328602



# LITHOLOGIC DESCRIPTION Coyote Wash #1

## Sample Cuttings

Note: Approximations of oil-shale grade in the cuttings descriptions are based on color characteristics observed in the field and are only rough estimates.

Feet	Description
0-100	No samples
100-195	Siltstone, light- to medium-gray, slightly to moderately calcareous, moderately hard and brittle, moderately consolidated; trace very fine grained, light- to medium-gray, well-sorted sandstone; trace mica flakes; trace greenish-gray clay-size particles; white to buff siltstone common from 165 to 195 feet
195-220	Siltstone and sandstone intermixed; light-greenish-gray, very friable, moderately to very calcareous; mica flakes common
220-230	Siltstone, light-greenish-gray and medium-gray, moderately soft and friable, very calcareous; trace sand-sized particles; trace iron oxide staining
230-245	Siltstone with sandstone and claystone. Siltstone, medium- to dark-grayish-brown, moderately hard and brittle, moderately consolidated; sandstone, fine- to medium-grained, medium-grayish-brown, slightly calcareous, poorly sorted, dirty; claystone, medium-greenish-gray, moderately soft and friable, slightly to moderately calcareous; trace manganese oxide staining
245-260	Siltstone, medium- to dark-grayish-brown, moderately hard and brittle, moderately consolidated
260-300	This interval is considered as one unit because the sample tags were unreadable. Sandstone with siltstone and claystone. Sandstone, very fine to fine grained, light-greenish-gray and medium-brown, poorly sorted, dirty, subangular grains, slightly calcareous, moderately- to well-consolidated; siltstone, medium- to dark-grayish-brown, slightly to moderately calcareous, fairly hard and brittle; claystone, medium-grayish-brown, moderately soft and friable, slightly calcareous; trace mica flakes; trace manganese oxide staining
300-320	Siltstone, medium-greenish-gray, moderately hard and brittle, moderately to very calcareous; trace mica flakes







# LITHOLOGIC DESCRIPTION Coyote Wash #1--continued

feet	Description
320-360	Siltstone, medium=grayish-brown, very hard and brittle, moderately calcareous; trace mica flakes; trace manganese oxide staining; trace medium- to fine-grained, medium-grayish-brown sandstone; abundant clay material from 335 to 350 feet
360-370	Sandstone, fine- to medium-grained, medium=grayish-brown and brown, poorly sorted, subangular grains, dirty, slightly calcareous; abundant mica flakes; trace greenish-gray, moderately soft claystone
370-400	Siltstone, medium=greenish-gray, slightly calcareous, moderately hard and brittle; trace fine- to medium-grained, medium=grayish-brown to brown, poorly sorted sandstone; trace pinpoint iron oxide staining; abundant clay material from 390 to 400 feet; trace moderately to well consolidated claystone fragments
400-490	Sandstone with siltstone and claystone. Sandstone, fine- to medium-grained, light- to medium-grayish-brown, poorly sorted, subangular grains, dirty, moderately calcareous, poorly consolidated; siltstone, medium=greenish-gray, slightly calcareous, moderately hard and brittle; claystone, medium=greenish-gray, poorly consolidated, moderately calcareous; abundant clay from 400 to 410 feet and from 480 to 490 feet
490-495	Sample missing
495-510	Siltstone, medium- to dark-gray, moderately hard, fairly calcareous
510-515	Sandstone, coarse-grained, medium-gray, fairly soft and friable, poorly sorted, dirty
515-525	Siltstone, medium=gray, hard; some fine-grained sand-size particles; trace pyrite
525-535	Sandstone, fine-grained, medium-gray, fairly hard, well-sorted, slightly silty; trace pyrite
535-545	Siltstone, light-gray, hard, slightly argillaceous, moderately calcareous
545-570	Siltstone, light-greenish-gray, hard; trace very fine grained sand-size particles
570-585	Sandstone, fine-grained, medium-gray, fairly hard, well-sorted; trace finely disseminated pyrite





# LITHOLOGIC DESCRIPTION Coyote Wash #1--continued

feet	Description
585-610	Siltstone, medium-gray, hard; trace finely disseminated pyrite; some fine-grained sand-size particles
610-625	Sandstone, fine-grained, medium-gray, fairly hard, moderately to well sorted, slightly silty, moderately calcareous
625-630	Claystone, light-greenish-gray, very hard, slightly silty, slightly calcareous
630-640	Sandstone, fine -to medium-grained, medium- to dark-gray, moderately hard, brittle, moderately well sorted, fairly calcareous
640-650	Sandstone, very fine to fine grained, medium-greenish-gray, moderately hard, brittle, well-sorted, slightly silty, fairly calcareous
650-660	Sandstone, fine-grained, medium-gray, moderately hard, well-sorted, slightly silty, very calcareous
660-665	Siltstone, medium-gray, hard, fairly calcareous; trace very fine grained sand-size particles
665-675	Claystone, medium-greenish-gray, very hard; trace silt-size particles
675-685	Siltstone, medium-gray, hard, fairly calcareous; trace fine-grained sand-size particles
685-690	Claystone, light-greenish-gray, very hard, silty material
690-700	Siltstone, light- to medium-gray, very hard, fairly calcareous; abundant clay material
700-705	Claystone, medium-gray, very hard, slightly calcareous; trace very fine silty material
705-710	Siltstone, light- to medium-gray, fairly hard, fairly calcareous
710-730	Sandstone, medium-grained, light-gray, moderately soft, very calcareous; clay material at 730 feet
730-745	Siltstone, medium- to dark-gray, moderately hard, fairly calcareous; trace fine-grained sand-size material





# LITHOLOGIC DESCRIPTION Coyote Wash #1--continued

feet	Description
745-775	Claystone, medium-gray, very hard, slightly calcareous; trace very fine silty material
775-785	Siltstone, medium-gray, moderately hard, fairly argillaceous, moderately calcareous
785-795	Claystone, medium-greenish-gray, very hard, slightly calcareous; trace very fine silty material; some finely disseminated pyrite
795-800	Sandstone, medium-grained, medium-gray, moderately hard, moderately well sorted, angular grains, low-porosity, highly calcareous
800-805	Siltstone, dark-greenish-gray, moderately hard, argillaceous, slightly calcareous; trace finely disseminated pyrite
805-815	Sandstone, fine- to medium-grained, medium-gray, hard, well-sorted, fairly calcareous, slightly silty; trace pyrite
815-850	Siltstone, medium-greenish-gray, hard, moderately calcareous; abundant clay material; trace finely disseminated pyrite
850-855	Claystone, light-gray, very soft, moderately calcareous; trace silt-size material
855-865	Siltstone, medium- to dark-gray, very hard, slightly calcareous, argillaceous; trace finely disseminated pyrite
865-885	Sandstone, fine-grained, light-gray, moderately hard, well-sorted, slightly silty; abundant finely disseminated pyrite; grades to siltstone at 885 feet
885-900	Siltstone, light-gray, hard, slightly calcareous; trace fine-grained sandy material from 890 to 895 feet; argillaceous from 895 to 900 feet
900-910	Sandstone, fine-grained, light-gray, moderately hard, moderately calcareous, well-sorted; trace finely disseminated pyrite





# LITHOLOGIC DESCRIPTION Coyote Wash #1--continued

feet	Description
910-915	Sandstone and siltstone. Sandstone, fine-grained, light-gray, moderately hard moderately calcareous, well-sorted; siltstone, medium-greenish-gray, very hard, slightly calcareous; trace very fine-grained sandy material; trace finely disseminated pyrite
915-920	Siltstone, medium-greenish-gray, very hard; trace very fine grained sandy material; grades to sandstone, fine-grained, light-gray, moderately sorted, hard, slightly argillaceous, moderately calcareous; abundant potassium feldspar(?) and carbonaceous material
920-930	Sandstone, fine-grained, light-gray, moderately sorted, hard, argillaceous, moderately calcareous; grades to siltstone, medium-greenish-gray, hard, fairly calcareous; abundant fine-grained sandy material
930-945	Sandstone, fine-grained, light-gray, hard, moderately calcareous; some potassium feldspar(?); trace finely disseminated pyrite; few scattered thin siltstone streaks
945-970	Siltstone, dark-gray, moderately hard, moderately calcareous, argillaceous; abundant finely disseminated pyrite; trace gilsonite; sandstone at 955 feet, fine-grained, light-gray, moderately sorted, hard, massive
970-985	Sandstone; very fine grained, light-gray, hard moderately calcareous, well-sorted, slightly silty; abundant finely disseminated pyrite
985-990	Siltstone, dark-gray, moderately hard, moderately calcareous; trace finely disseminated pyrite; trace fine-grained sand
990-1000	Sandstone, fine-grained, light-gray, moderately soft, calcareous, well-sorted
1000-1010	Siltstone, medium- to dark-gray, moderately hard, very calcareous; abundant finely disseminated pyrite; abundant clay material
1010-1015	Siltstone, medium- to dark-gray, moderately hard, very calcareous; grades to sandstone, slightly silty; trace finely disseminated pyrite
1015-1020	Sandstone, fine-grained, light-gray, hard, very calcareous, well-sorted; grades to siltstone; trace finely disseminated pyrite; few scattered gilsonite streaks





# LITHOLOGIC DESCRIPTION Coyote Wash #1--continued

feet	Description
1020-1025	Siltstone, dark-gray, hard, very calcareous
1025-1035	Sandstone, very fine to fine-grained, medium-gray, hard, moderately calcareous, silty; abundant finely disseminated pyrite; few scattered gilsonite streaks
1035-1040	Siltstone, medium- to dark-gray, hard, moderately calcareous, slightly argillaceous; abundant finely disseminated pyrite
1040-1045	Siltstone and claystone. Sandstone, medium- to dark-gray, hard, moderately calcareous; claystone, light-tan, very hard
1045-1050	Sandstone, fine-grained, light-gray, hard, well-sorted, very calcareous; abundant finely disseminated pyrite
1050-1060	Sandstone, fine-grained, light-gray, very soft, unconsolidated, very calcareous, moderately- to well-sorted
1060-1070	Siltstone, medium- to dark-gray, moderately hard, slightly calcareous; trace finely disseminated pyrite
1070-1100	Sandstone, fine- to medium-grained, very soft, unconsolidated, very calcareous, moderately to well sorted
1100-1165	Sandstone and siltstone. Sandstone, medium- to coarse-grained, very soft, unconsolidated, very calcareous, moderately to well sorted; siltstone, medium-gray, hard, slightly calcareous from 1,115 to 1,120 feet
1165-1170	Sandstone and siltstone. Sandstone, very soft, unconsolidated, very calcareous, moderately to well sorted; siltstone, dark-gray, hard, fairly calcareous; trace finely disseminated pyrite
1170-1185	Sandstone, fine-grained, light-gray, moderately hard, moderately calcareous; abundant finely disseminated pyrite; trace potassium feldspar(?)
1185-1190	Sandstone, fine-grained, light-gray, moderately hard, well-sorted, moderately calcareous, slightly silty
1190-1195	Siltstone, dark-gray, moderately hard, slightly calcareous some very fine grained sand sized material





# LITHOLOGIC DESCRIPTION Coyote Wash #1--continued

feet	Description
1195-1200	Sandstone, very fine grained, light-gray, fairly hard, silty, moderately calcareous; trace very finely disseminated pyrite
1200-1210	Claystone, light-gray, very soft, unconsolidated, very calcareous; silty from 1,205 to 1,210 feet
1210-1235	Sandstone, medium- to coarse-grained, very soft, unconsolidated, very calcareous; abundant silty material
1235-1250	Sandstone, medium-grained, very soft, unconsolidated, very calcareous; grades to siltstone, medium-gray, hard, moderately calcareous; abundant clay material; abundant fine-grained sandy material; trace gilsonite streaks
1250-1260	Sandstone, fine-grained, light- to medium-gray, moderately soft, unconsolidated to fairly well cemented, slightly calcareous, poorly to moderately sorted; grades to siltstone at 1,260 feet
1260-1280	Siltstone, light-gray to medium-greenish-gray, moderately hard, moderately calcareous; moderate amount of fine-grained sandy material from 1,260 to 1,270 feet
1280-1285	Claystone, light-gray, very soft, crumbly, moderately calcareous, slightly silty
1285-1310	Sandstone, very fine to fine-grained, light-gray to light-brownish-gray, moderately hard, slightly calcareous, silty; trace finely disseminated pyrite
1310-1320	Sandstone, fine-grained, light-gray, moderately hard, poorly to moderately sorted, slightly silty; trace gilsonite
1320-1325	Sandstone, fine-grained, light-gray, moderately hard, poorly to moderately sorted; grades to siltstone, medium-green to medium-brownish-gray, hard, argillaceous; some fine-grained sand size material
1325-1330	Siltstone, medium-green to medium-brownish-gray, hard, argillaceous; grades to sandstone, fine-grained, light-greenish-gray, hard, well-sorted, slightly calcareous
1330-1335	Sandstone and siltstone. Sandstone, fine- to medium-grained, light-gray, hard, moderately well sorted, dirty, slightly calcareous; siltstone, medium-brownish-gray, hard, moderately calcareous, moderately argillaceous





# LITHOLOGIC DESCRIPTION Coyote Wash #1--continued

feet	Description
1335-1350	Siltstone and sandstone. Siltstone, medium-gray, hard, moderately calcareous; sandstone, fine- to medium-grained, light-gray, fairly hard, slightly calcareous, slightly silty
1350-1365	Shale, medium- to dark-gray to medium-brownish-gray, hard, brittle; abundant silty material; trace fine-grained sand size material
1365-1370	Siltstone, light-green to medium-brown, hard, slightly calcareous, argillaceous; moderate amount of very fine grained sandy material with abundant finely disseminated pyrite
1370-1375	Siltstone, light-green to medium-brown, hard, slightly calcareous, argillaceous; grades to sandstone, fine-grained, light-gray to greenish-gray, hard; trace finely disseminated pyrite
1375-1390	Siltstone, medium-brownish-gray, moderately hard; trace fine-grained sand sized material; scattered medium-grained, medium-gray, soft, sandy material; trace dark-green shale
1390-1400	Sandstone, fine-grained, light-gray, moderately friable, moderately sorted, moderately dirty; abundant finely disseminated pyrite; possible manganese oxide staining
1400-1430	Sandstone, fine-grained, light- to medium-gray, moderately hard, silty; trace asphalt; trace pyrite
1430-1445	Siltstone, medium-gray, moderately hard, slightly argillaceous, slightly calcareous; trace very fine grained sandy material
1445-1490	Siltstone, medium-gray to light-brownish-gray, moderately hard, brittle; trace finely disseminated pyrite; trace fine-grained sand size material; trace altered muscovite
1490-1505	Siltstone and marlstone. Siltstone, light-brownish-gray, hard, slightly calcareous; marlstone, light-brownish-gray, hard, brittle; trace kerogen
1505-1510	Siltstone, light-brownish-gray, hard, slightly calcareous; grades to sandstone, fine-grained, light-gray, hard, well-sorted, slightly calcareous; oil shale, marly - TOP OF GREEN RIVER FORMATION AT 1,509 FEET





# LITHOLOGIC DESCRIPTION Coyote Wash #1--continued

feet	Description
1510-1530	Oil shale, marly, light- to medium-brownish-gray, hard, brittle, very low to low grade, highly calcareous
1530-1550	Oil shale, medium-brown, hard, brittle, low- to medium-grade, very calcareous, slightly marly
1550-1575	Oil shale, light- to medium-brownish-gray, moderately hard, brittle, low-grade, very calcareous; trace finely disseminated pyrite; trace nahcolite(?); abundant silty and fine-grained sandy material probably due to caving
1575-1610	Oil shale, marly, light-brownish-gray, fairly hard, brittle, very low to low grade, very calcareous; trace finely disseminated pyrite; trace nahcolite(?)
1610-1615	Oil shale, light- to medium-brown, hard, fairly brittle, low-grade, fairly calcareous; trace gilsonite
1615-1630	Oil shale, light-grayish-brown, hard, brittle, very low to low grade, slightly calcareous, fairly marly; trace finely disseminated pyrite and black altered pyrite; abundant light-gray granular tuff streaks; calcite(?) crystals common from 1,625 to 1,630 feet
1630-1670	Oil shale, light- to medium-brown, hard, fairly brittle, low-grade, very calcareous, marly from 1,630 to 1,635 feet and from 1,640 to 1,645 feet; trace gilsonite; trace pyrite
1670-1730	Oil shale, medium-brown to medium-brownish-gray, hard, brittle, low- to medium-grade, slightly calcareous; abundant finely disseminated pyrite; trace light-gray tuff material from 1,685 to 1,690 feet, 1,705 to 1,710 feet, and from 1,725 to 1,730 feet
1730-1765	Oil shale, medium-brown, hard, brittle, medium-grade, moderately calcareous; trace marly material; abundant light-grayish-brown, very low to low grade oil-shale streaks; trace fresh crystalline nahcolite; trace pyrite; trace clay material from 1,745 to 1,750 feet due to caving
1765-1785	Oil shale, light- to medium-brown, hard, moderately brittle, low- to medium-grade, moderately calcareous; trace fresh crystalline nahcolite; abundant silty material due to caving; few scattered zones of medium- to dark-brown, medium- to high-grade oil shale





# LITHOLOGIC DESCRIPTION Coyote Wash #1--continued

feet	Description
1785-1810	Oil shale, light-brownish-gray to light-brown, moderately hard, low-grade, highly calcareous; abundant marly material; abundant silty material due to caving; trace nahcolite
1810-1817	Oil shale, medium-brown, hard, low- to medium-grade, very calcareous; trace nahcolite; trace buff marly material; trace granular tan tuff material.
1817.0	Core point
1817.0-1825.8	Oil shale, light-brown to light-grayish-brown, nearly massive with trace even bedding, good competence; several scattered gilsonite streaks; few scattered light-bluish-gray granular analcitized tuff streaks and stringers with a 0.1 foot bleb at 1,824.0 feet; a 0.1 foot coarsely crystalline, asphalt-saturated nahcolite band at 1,825.8 feet
1825.8-1830.2	Oil shale, light- to medium-brown, massive with trace even and looped bedding, competent; few scattered gilsonite streaks; trace scattered pyritic tuff streaks and stringers; a 0.35 foot medium-brown, asphaltic tuff band at 1,827.6 feet; a 0.1 foot zone of altered pinpoint nahcolite at 1,828.5 feet, a 0.05 foot zone at 1,829.0 feet; asphaltic resin common on parting and fracture surfaces
1830.2-1831.0	0.8 foot core loss
1831.0-1836.0	Oil shale, light-brown to light-grayish-brown, massive with trace even bedding, competent; few scattered light-bluish-gray granular analcitized tuff streaks and stringers; trace gilsonite streaks; a 0.1-foot band of medium-brown oil shale at 1,831.5 feet
1836.0-1838.1	Oil shale, light- to medium-brown, massive with trace even bedding, competent, argillaceous; abundant gilsonite streaks; abundant asphalt on partings; trace nahcolite
1838.1-1839.0	0.9 foot core loss
1839.0-1847.9	Oil shale, light- to medium-brown, even with streaked bedding, competent; trace light-bluish-gray granular analcitized tuff streaks; trace gilsonite streaks; a 0.25 foot leached nahcolite pod with bladed and radial structure at 1,842.7 feet and a 0.05 foot pod at 1,843.0 feet; asphaltic resin and nahcolite common on parting and fracture surfaces





# CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
1847.9-1850.0	2.1 foot core loss
1850.0-1853.2	Oil shale, light- to medium-brown, massive with trace even bedding, competent; scattered medium-brown pinpoint nahcolite bands; abundant gilsonite streaks; trace light-bluish-gray granular analcitized tuff streaks
1853.2-1854.0	Oil shale, medium-brown, massive with trace even bedding, competent; trace gilsonite streaks; trace pinpoint nahcolite; few scattered buff, marly streaks; drill induced rubble
1854.0-1868.5	14.5 foot loss due to mismatch
1868.5-1870.2	Oil shale, light- to medium-brown, looped and even bedding with streaks and trace massive bedding, competent; trace light-gray tuff stringers; well-cemented solution fracture zone from 1,869.2 to 1,869.7 feet; trace gilsonite stringers at 1,870.2 feet
1870.2-1875.3	Oil shale, light- to medium-brown, massive with trace streaked and even bedding, very competent; abundant gilsonite streaks; trace light-bluish-gray and dark-gray granular analcitized tuff streaks and blebs; a 0.2 foot band of medium-brownish-gray nahcolite at 1,870.2 feet; abundant well-cemented solution fractures; gradational contact
1875.3-1881.0	Oil shale, light- to medium-brown, massive with trace streaked bedding, competent; trace light-bluish-gray granular analcitized tuff blebs; few scattered dark-brown oil-shale stringers; a 0.2 foot dark-brown to black nahcolite band with bladed and radial structure at 1,877.0 feet, a 0.1 foot band at 1,879.4 feet, a 0.4 foot zone at 1,878.1 feet with calcite and halite(?), a 0.2 foot zone at 1,880.5 feet; a large solution fracture zone with asphaltic resin coating from 1,873.5 to 1,881.0 feet
1881.0-1894.0	Oil shale, light- to medium-brown to grayish-brown, even and massive bedding, very competent; few scattered light-bluish-gray granular analcitized tuff streaks and blebs; trace gilsonite streaks; trace pinpoint white altered nahcolite; gradational contact





# CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
1894.0-1899.4	Oil shale, light- to medium-brown, even bedding, very competent; trace gilsonite streaks; trace light-bluish-gray granular analcitized tuff blebs; solution fracture zone with calcite(?), gilsonite and asphalt from 1,896.8 to 1,900.2 feet
1899.4-1901.2	Oil shale, medium- to dark-brown, even with trace streaked bedding, competent; trace gilsonite streaks; several scattered buff marly streaks and stringers
1901.2-1903.0	1.8 foot core loss
1903.0-1905.6	Oil shale, interbedded with marlstone and tuff. Oil shale, light- to medium-brown and medium-grayish-brown, irregular, looped, even and massive bedding, competent; tuff, medium-grayish-brown, numerous dark-brown, oil-shale stringers; marlstone, light-brown to buff stringers; asphaltic resin coating on fracture surfaces; trace gilsonite streaks
1905.6-1908.0	Oil shale, light-grayish-brown to medium-brown, even bedding, competent; trace medium- to dark-brown oil-shale stringers; trace medium- to dark-brown, asphaltic tuff blebs and streaks; a medium- to dark-brown 0.05 foot tuff stringer at 1,905.5 feet; a 0.5 foot core loss from 1,907.5 to 1,908.0 feet
1908.0-1912.4	Oil shale, light- to medium-olive-brown, even with trace massive bedding, fairly competent; trace gilsonite streaks and blebs; an 80 degree solution fracture from 1,908.0 to 1910.0 feet with asphaltic resin on fracture surface
1912.4-1913.0	0.6 foot core loss
1913.0-1914.9	Oil shale, medium- to dark-brown, even with trace looped and irregular bedding, fairly competent; trace gilsonite streaks and stringers; few scattered light- to medium-brown oil-shale streaks and stringers
1914.9-1918.2	Oil shale, light-grayish-brown to medium-brown, even with massive bedding, fairly competent; trace gilsonite streaks; a 90 degree solution fracture with asphaltic resin coating from 1,916.2 to 1,918.2
1918.2-1922.0	3.8 foot core loss





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
1922.0-1922.6	Oil shale, medium-brown, massive, competent; trace greenish-gray pyrite streaks and stringers; solution fracture zone with asphaltic resin
1922.6-1925.0	2.4 foot core loss
1925.0-1926.9	Oil shale, medium-brown, massive and even bedding, fairly competent; few scattered greenish-gray pyrite streaks, stringers and blebs; drill induced rubble from 1,926.3 to 1,926.9 feet; fracture surfaces of rubble reveal disseminated calcite(?), pyrite, and asphaltic resin; trace medium-brown crystalline nahcolite stringers
1926.9-1935.0	8.1 foot core loss
1935.0-1943.9	Oil shale, medium- to dark-brown to medium-grayish-brown, even with massive bedding, competent; abundant dark-brown to black asphaltic tuff streaks stringers and blebs; few scattered greenish-gray pyrite streaks; few scattered marlstone stringers; few scattered nahcolite stringers paired with white crystalline stringers and medium- to dark-brown stringers; gradational contact
1943.9-1947.3	Oil shale, medium- to dark-brown, even with inclined (15 degrees) bedding, competent; a 0.2 foot band of dark-brown pyritic tuff at 1,944.6 feet; trace tan to buff marlstone stringers; trace dark-gray to black asphaltic tuff streaks and stringers; trace light-greenish-gray granular analcitized tuff blebs
1947.3-1950.0	Oil shale, light- to medium-brown to grayish-brown, even bedding, competent; few scattered greenish-gray analcitized tuff streaks and blebs with disseminated pyrite; trace dark-brown to medium-gray asphaltic tuff blebs; few scattered dark-brown oil-shale stringers
1950.0-1953.1	Oil shale, medium- to dark-brown, even with looped and irregular bedding, competent; abundant dark-brown oil-shale streaks and stringers; a 0.3 foot band of dark-brown to black oil shale at 1,950.2 feet, a 0.1 foot band at 1,950.6 and 1,950.8 feet; trace greenish-gray granular pyritic tuff blebs
1953.1-1957.0	Oil shale, light- to medium-brown to grayish-brown, even bedding, competent; a 0.2 foot band of medium-brown oil shale at 1,953.1 feet; few scattered greenish-gray, granular tuff streaks, stringers, and blebs; trace gilsonite streaks; trace asphaltic tuff streaks





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
1957.0-1982.2	Oil shale, medium- to dark-brown, even with trace looped and irregular bedding, competent; abundant dark-brown asphaltic tuff bands, stringers, streaks, and blebs; abundant medium- to dark-brown oil-shale bands and stringers; a 0.7 foot zone of dark-brown oil shale at 1,965.1 feet; a large medium-brown to gray, granular tuff pod at 1,959.0 feet; trace light-brown to buff marlstone streaks and stringers; trace greenish-gray, granular, analcitized tuff streaks and blebs; trace gilsonite streaks
1982.2-1984.4	Oil shale, medium- to dark-brown, even with trace irregular bedding, competent; abundant dark-brown asphaltic tuff streaks, stringers, and blebs; abundant medium- to dark-brown oil-shale streaks and stringers; trace marlstone stringers; trace pyritic tuff streaks and stringers
1984.4-1991.7	Oil shale, medium-brown to grayish-brown, even with trace looped and contorted bedding, competent; few scattered dark-brown to gray asphaltic, granular, tuff bands, stringers, streaks, and blebs; trace white to medium-gray altered nahcolite stringers, streaks and blebs; trace greenish-gray granular analcitized tuff stringers and blebs; trace gilsonite streaks; trace medium- to dark-brown oil-shale stringers
1991.7-1994.3	Oil shale, medium- to dark-brown, even bedding, competent; trace gilsonite streaks; trace dark-brown to black asphaltic tuff stringers and blebs; gradational contact
1994.3-1998.1	Oil shale, medium-brown, even bedding, competent; trace gilsonite streaks; trace dark-brown to black asphaltic tuff streaks and blebs; trace light-brown to buff marlstone blebs
1998.1-1999.5	Oil shale, medium- to dark-brown, irregular with contorted and streaked and trace looped bedding, very competent; trace greenish-gray granular, analcitized tuff streaks and blebs; trace dark-gray to black and white speckled granular tuff pods and streaks
1999.5-2002.6	Oil shale, medium-brown to grayish-brown, irregular, contorted, looped and streaked bedding, very competent; few scattered green to dark-gray granular tuff pods, streaks and stringers; trace light- to medium-brown tuff stringers; trace marlstone stringers and streaks; trace gilsonite streaks





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2002.6-2005.7	Oil shale, medium- to dark-brown, looped and irregular with trace even bedding, competent; abundant dark-brown oil-shale streaks and stringers, a 0.1 foot band at 2,002.9 feet; trace greenish-gray, granular tuff stringers; trace gilsonite streaks; gradational contact
2005.7-2011.0	Oil shale, medium- to dark-brown, even with trace looped and contorted bedding, competent; abundant greenish-gray granular tuff streaks, stringers and blebs; few scattered medium- to dark-brown granular tuff streaks, stringers, and blebs; a 0.6 foot zone of dark-brown oil shale at 2,009.4 feet
2011.0-2012.9	Oil shale, light- to medium-brown to grayish-brown, even with trace offset and streaked bedding, very competent; few scattered medium- to dark-brown asphaltic tuff streaks and stringers; few scattered greenish-gray granular tuff streaks and blebs; trace gilsonite streaks; a 0.4 foot zone of light-brown to tan oil shale at 2,012.0 feet
2012.9-2015.4	Oil shale, medium- to very dark brown, even, looped and curved bedding, competent; a 0.9 foot bed of very dark brown oil shale at 2,014.5 feet; numerous dark-brown to black granular, asphaltic tuff streaks, stringers, and blebs; a 0.1 foot band at 2,014.7 feet; trace gilsonite streaks; trace dark-greenish-gray pyritic tuff streaks and blebs; trace light-brown to buff tuff streaks, stringers, and blebs; gradational contact
2015.4-2018.5	Oil shale, medium-grayish-brown, even with looped bedding and trace contorted bedding, competent; abundant greenish-gray to black pyritic tuff streaks, stringers, and blebs; a 0.1 foot band of medium- to dark-brown asphaltic tuff at 2,016.4 feet; trace gilsonite streaks
2018.5-2020.2	Oil shale, light- to medium-brown to grayish-brown, even and massive with trace contorted bedding, competent; few scattered medium-gray to black granular tuff streaks, stringers, and blebs; trace medium- to dark-brown granular asphaltic tuff streaks and stringers; a 0.1 foot band of medium-brown nahcolite at 2,020.1 feet
2020.2-2023.2	Oil shale, medium-brown to grayish-brown, even with trace contorted bedding, competent; numerous medium- to dark-brown granular, asphaltic tuff bands, streaks, and stringers; few scattered gray to dark-gray granular, pyritic tuff streaks, stringers, and blebs; gradational contact





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2023.2-2030.8	Oil shale, light- to medium-brown to gray-brown, even with trace looped and contorted bedding, competent; numerous greenish-gray granular, pyritic tuff streaks, stringers, and blebs; few scattered dark-brown to black asphaltic tuff stringers and streaks; trace gilsonite streaks; trace asphalt streaks; numerous medium- to dark-brown oil-shale streaks and stringers; a 0.05 foot light-bluish-gray granular, analcitized tuff band at 2,029.9 feet; gradational contact
2030.8-2032.8	Oil shale, medium- to dark-mahogany-brown, even with contorted and trace looped bedding, competent; few scattered greenish-gray to black granular, pyritic tuff stringers, streaks, and blebs; trace light- to medium-brown nahcolite pods; trace asphalt streaks and stringers; a 0.1 foot band of light-brown to buff oil shale at 2,031.9 feet
2032.8-2039.9	Oil shale, light- to medium-brown to grayish-brown, massive and even with trace contorted bedding, competent; numerous greenish-gray granular, pyritic tuff streaks, stringers, and blebs, a 0.05 foot band at 2,034.1 feet; trace asphalt streaks and blebs; trace light-bluish-gray granular, analcitized tuff streaks and blebs; trace light- to medium-brown nahcolite blebs; gradational contact
2039.9-2043.0	Oil shale, medium- to dark-brown, even and contorted bedding with trace looped and offset bedding, competent; numerous dark-brown to black oil-shale streaks and stringers, a 0.2 foot band at 2,040.4 feet; trace greenish-gray pyritic tuff stringers, streaks, and blebs; trace gilsonite streaks; trace asphalt streaks; trace medium- to dark-brown asphaltic tuff streaks and stringers; drill induced rubble from 2,042.4 to 2,043.0 feet
2043.0-2043.6	0.6 foot core loss
2043.6-2045.7	Oil shale, light- to medium-brown to buff, even with trace contorted bedding, competent; a 0.2 foot band of light-bluish-gray granular, analcitized tuff at 2,044.4; trace greenish-gray granular, pyritic tuff streaks, stringers, and blebs; trace asphalt streaks; trace dark-brown asphaltic tuff streaks





# CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2045.7-2049.9	Oil shale, medium- to dark-brown, even and massive with trace looped and contorted bedding, competent; a 0.7 foot band of very dark brown oil shale at 2,047.3 feet; trace greenish-gray pyritic tuff streaks and stringers; trace asphalt streaks and blebs; trace gilsonite streaks
2049.9-2055.3	Oil shale, light- to medium-brown to grayish-brown, even and massive bedding, competent; numerous greenish-gray granular, pyritic tuff streaks, stringers, and blebs; trace gilsonite streaks; trace asphalt streaks; gradational contact
2055.3-2056.8	Oil shale, medium- to dark-brown, even, contorted, and streaked bedding, competent; abundant greenish-gray pyritic tuff streaks and stringers; a 0.1 foot band of dark-brown oil shale at 2,055.4 feet, numerous streaks and stringers; trace light- to medium-brown nahcolite pods; gradational contact
2056.8-2063.5	Oil shale, light- to medium-gray brown, even and massive bedding, competent, slightly marly; several scattered asphalt streaks and stringers; few scattered pyritic tuff stringers; trace gilsonite streaks; a 0.05 foot asphaltic tuff band at 2,057.2 feet
2063.5-2066.2	Oil shale, medium-brown, even bedding, competent; abundant pyritic tuff streaks; a 0.05 foot asphaltic tuff band at 2,063.7 feet, a 0.15 foot band at 2,066.0; trace scattered gilsonite streaks and stringers; several scattered dark-brown oil-shale stringers; few scattered asphalt stringers
2066.2-2067.0	Oil shale, dark-brown, even bedding, very competent; few scattered asphalt streaks and few scattered gilsonite streaks and stringers
2067.0-2069.0	Oil shale, medium-brown, even bedding, competent; several scattered gilsonite streaks; 0.2 foot asphaltic tuff bands at 2,067.3, 2,067.5, and 2,067.8 feet; few scattered pyritic tuff streaks and blebs; trace bleeding asphalt in tuff and on fracture surfaces
2069.0-2070.3	Oil shale, marly, light-grayish-brown, massive with trace even bedding, very competent; trace asphaltic tuff streaks and stringers; abundant finely disseminated pyrite





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2070.3-2071.1	Oil shale, dark-brown to black, even, looped and irregular bedding, competent; trace gilsonite streaks; abundant finely disseminated pyrite
2071.1-2075.5	Oil shale, light-grayish-brown, massive and even bedding, competent; abundant gilsonite stringers and streaks; abundant pyritic tuff streaks and stringers; few scattered medium-brown oil-shale stringers; a 0.05 foot bleeding asphaltic tuff band at 2,071.7 feet
2075.5-2079.2	Oil shale, light-brown to medium-grayish-brown, massive with trace even bedding, competent; a 0.05 foot white analcitized tuff band at 2,077.4; few scattered tuff blebs and streaks; few scattered medium-brown oil-shale stringers; trace asphaltic tuff blebs
2079.2-2080.9	Oil shale, dark-grayish-brown, even and looped bedding, very competent; few scattered asphaltic tuff blebs; trace scattered pyritic tuff streaks
2080.9-2091.5	Oil shale, medium-grayish-brown, even bedding, competent; several scattered gilsonite stringers; abundant irregular pyritic tuff streaks, stringers and blebs; a 0.6 foot zone of irregular asphaltic tuff streaks and stringers at 2,085.1 feet, a 0.15 foot zone at 2,085.8 feet; a 0.05 foot irregular asphaltic tuff bleb at 2,087.1 feet; a 0.2 foot bleb at 2,088.9 feet
2091.5-2093.7	Oil shale, dark-brown to black, even bedding, competent; a 0.1 foot asphaltic tuff band at 2,092.1; few scattered asphalt streaks; trace gilsonite streaks; abundant finely disseminated pyrite
2093.7-2105.8	Oil shale, light- to medium-brown, even with trace massive bedding, competent; a 0.5 foot zone of irregular asphaltic tuff streaks and stringers at 2,094.0 feet, 0.2 foot bands of asphaltic tuff at 2,095.1, 2,095.3, 2,095.4, 2,098.1, and 2,101.3 feet; 0.5 foot bands at 2,101.8, 2,103.7, and 2,103.9 feet; a 0.3 foot zone of irregular tuff stringers at 2,103.4 feet; a 0.15 foot zone at 2,105.6 feet; trace scattered pyritic tuff blebs; trace gilsonite streaks
2105.8-2110.2	Oil shale, light-brown, even with trace massive bedding, competent; a 0.15 foot irregular asphaltic tuff band at 2,107.3 feet; a 0.1 foot band at 2,109.4 and 2,109.9 feet; abundant pyritic tuff streaks and stringers; trace gilsonite streaks





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2110.2-2114.1	Oil shale, medium-brown, even and streaked bedding, competent; abundant irregular asphaltic tuff streaks; a 0.1 foot asphaltic tuff band at 2,110.5 feet; trace gilsonite streaks; several scattered light-gray granular, analcitized tuff streaks; trace pyritic tuff streaks
2114.1-2118.9	Oil shale, light-brown, even with trace massive bedding, competent; a 2.2 foot fracture filled with asphalt from 2,114.1 feet to 2,116.4 feet; several pyritic tuff streaks; abundant irregular asphaltic tuff streaks; a 0.1 foot asphaltic tuff band at 2,116.7 feet; a 0.05 irregular pyritic tuff band at 2,116.9 feet; few scattered buff marly stringers
2118.9-2130.5	Oil shale, medium-grayish-brown to medium-brown, even with trace streaked and looped bedding, competent; abundant pyritic tuff streaks; several asphaltic tuff streaks; trace gilsonite streaks; few scattered buff, marly stringers; irregular asphaltic tuff stringers and streaks interbedded with oil shale: "WAVY TUFF"
2130.5-2140.7	Oil shale, medium-brown, even with trace massive and streaked bedding, competent; trace gilsonite streaks; trace light-bluish-gray granular, analcitized tuff streaks; a 0.05 foot irregular asphaltic tuff band at 2,133.3 feet; several scattered pyritic tuff streaks; few scattered dark-brown oil-shale stringers
2140.7-2149.5	Oil shale, medium-olive-brown, massive and even bedding, competent; abundant light-bluish-gray granular, analcitized tuff streaks and stringers; few scattered buff, marly stringers; trace gilsonite streaks; few scattered pyritic tuff streaks and blebs; a 0.2 foot dark-brown oil-shale band at 2,146.1 feet
2149.5-2152.5	Oil shale, marly, tan to light-brown, massive with even bedding, competent; few scattered pyritic tuff blebs; trace gilsonite streaks; a 0.2 foot irregular, asphaltic tuff band at 2,151.7 feet
2152.5-2169.5	Oil shale, light- to medium-brown, even and massive bedding, competent; few scattered gilsonite streaks; several scattered dark-brown oil-shale stringers; bleeding asphalt on fracture surfaces; trace scattered pyritic tuff streaks; trace scattered asphaltic tuff streaks; few scattered dark-brown oil-shale bands





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2169.5-2171.7	Oil shale, light- to medium-brown, even with massive bedding, competent; few scattered dark-greenish-gray pyritic tuff blebs and streaks; 0.1 foot bands of light-brown to buff oil shale at 2,170.0 and 2,174.4 feet
2171.7-2175.9	Oil shale, medium- to dark-brown, even with trace contorted bedding, competent; few scattered dark-greenish-gray granular, pyritic tuff streaks and stringers; trace asphalt streaks; few scattered dark-brown oil-shale streaks and stringers
2175.9-2177.5	Oil shale, light-brown to buff, even with trace streaked bedding, competent; trace greenish-gray, pyritic tuff blebs and streaks; trace dark-brown oil-shale streaks
2177.5-2179.0	Oil shale, medium-olive-brown, even, looped, and contorted bedding, competent; trace light-gray, pyritic tuff streaks; trace asphaltic tuff blebs
2179.0-2195.4	Oil shale, marly, light-brown to light-grayish-brown, even and massive with trace looped and inclined bedding, fairly competent; 2.7 foot fracture from 2,180.2 to 2,182.9 feet; a 0.5 foot coarsely crystalline light- to medium-brown nahcolite band at 2,186.7 feet; abundant tan to buff marlstone streaks and stringers; few scattered dark-brown asphaltic tuff streaks and stringers; few scattered medium- to dark-gray pyritic tuff streaks; trace gilsonite streaks and stringers. "A" GROOVE
2195.4-2197.2	Oil shale, medium- to dark-olive-brown, inclined (at 15 degrees), contorted and looped bedding, competent; few scattered dark-greenish-gray pyritic tuff streaks; a 0.4 foot band of dark-brown coarsely granular nahcolite at 2,196.4 feet. TOP OF MAHOGANY ZONE AT 2,195.4 FEET
2197.2-2202.3	Oil shale, marly, light-tan to buff, streaked, inclined and contorted bedding, competent; abundant dark-brown to gray asphaltic tuff streaks, stringers, and blebs; 0.05 foot bands at 2,201.4 and 2,201.9 feet; a 0.1 foot pod at 2,198.9 feet; few scattered greenish-gray pyritic tuff streaks and blebs
2202.3-2204.6	Oil shale, interbedded with tuff, light- to medium-brown to dark-grayish-brown, streaked, looped, contorted and inclined bedding, competent; a 0.2 foot band of asphaltic tuff at 2,202.7 feet; a 0.2 foot light- to medium-brown asphaltic tuff band at 2,203.4 feet; numerous dark-greenish-gray pyritic tuff blebs and streaks; numerous dark-brown asphaltic tuff streaks and blebs





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2204.6-2207.6	Oil shale, light- to medium-olive-brown, even and looped bedding, competent; few scattered dark-brown oil-shale stringers; few scattered asphaltic tuff blebs; several scattered pyritic tuff stringers and streaks; a 0.45 foot band of coarsely crystalline, dark-brown nahcolite at 2,207.0 feet
2207.6-2209.0	Oil shale, dark-brown, even with trace looped and contorted bedding, competent; a 0.05 foot asphaltic tuff stringer at 2,208.5 feet; a 0.05 foot irregular pyritic tuff stringer at 2,208.6 feet; trace gilsonite streaks
2209.0-2215.0	Oil shale, medium- to light-olive-brown, even with trace irregular bedding, competent; several scattered buff marly streaks and stringers; several scattered asphaltic and pyritic tuff streaks and blebs; trace gilsonite streaks
2215.0-2224.5	Oil shale, medium-gray-brown, even with streaked and trace massive bedding, competent; abundant buff marly streaks; several scattered pyritic tuff streaks and stringers; asphaltic resin common on partings; a 0.3 foot asphaltic tuff band at 2,219.7 feet; few scattered medium- to dark-brown oil-shale stringers
2224.5-2226.2	Oil shale, dark-mahogany-brown, even with trace irregular and streaked bedding, competent; trace light-gray, pyritic tuff stringers; trace gilsonite streaks; low density
2226.2-2229.3	Oil shale, light-olive-brown, even and irregular bedding, competent; several scattered medium-brown oil-shale stringers; trace scattered pyritic tuff streaks and blebs; few scattered buff marly streaks and stringers
2229.3-2234.5	Oil shale, medium-olive-brown, even, irregular, contorted with trace looped bedding, competent; abundant pyritic tuff streaks and blebs; a 0.35 foot asphaltic tuff band at 2,230.5 feet; trace asphaltic tuff blebs; few scattered buff, marly streaks and blebs
2234.5-2238.2	Oil shale, dark-brown to black, irregular, looped, inclined with trace even bedding, competent; few scattered light-brown oil-shale bands; a 0.1 foot dark-brown coarsely crystalline, nahcolite pod at 2,237.2 feet; a 0.4 foot dark-brown coarsely crystalline, nahcolite band at 2,237.8 feet. MAHOGANY OIL-SHALE BED





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2238.2-2240.5	Oil shale, light- to medium-brown, even with trace inclined and looped bedding, very competent; trace pyritic tuff streaks and stringers; trace buff marly streaks and stringers
2240.5-2241.7	Oil shale, dark-mahogany-brown to black, even with trace looped bedding, very competent; trace gilsonite streaks; evidence of bubbling core
2241.7-2246.0	Oil shale, medium- to dark-olive-brown, even with trace irregular, streaked, and looped bedding, very competent; trace light-bluish gray granular, analcitized tuff streaks; trace pyritic tuff streaks
2246.0-2248.3	Oil shale, dark-mahogany-brown, streaked, looped and contorted bedding, very competent; a 0.05 foot asphaltic tuff bleb at 2,247.5 feet; asphaltic resin on partings; low density
2248.3-2263.2	Oil shale, light to medium-olive-brown, even with looped and irregular bedding, competent; trace scattered light-bluish-gray granular analcitized tuff streaks and stringers; trace gilsonite streaks; several scattered dark-brown oil-shale stringers; slightly darker from 2,261.3 to 2,261.9 feet; a 0.2 foot zone of irregular, asphaltic tuff stringers at 2,255.6 feet; a 0.05 foot irregular, light-bluish-gray granular, analcitized tuff stringer at 2,262.4 feet
2263.2-2267.5	Oil shale, light olive-brown, even with trace looped and irregular bedding, competent; trace gilsonite streaks; trace light-bluish gray granular analcitized tuff streaks and stringers; slightly marly
2267.5-2268.5	Oil shale, dark-brown, streaked and irregular bedding, competent; 0.05 foot irregular asphaltic tuff stringer at 2,268.2 feet; trace gilsonite streaks
2268.5-2274.5	Oil shale, light-olive-brown, even with trace streaked and irregular bedding, fairly competent; few scattered gilsonite streaks; trace scattered pyritic tuff streaks; few scattered light-bluish gray granular, analcitized tuff streaks; several scattered medium- to dark-brown oil-shale stringers; bubbling core
2274.5-2283.7	Oil shale, medium-olive-brown, streaked with looped and massive bedding, very competent; trace gilsonite streaks; few scattered gilsonite streaks; few scattered asphalt streaks; several scattered light-bluish gray granular, analcitized tuff streaks





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2283.7-2293.0	Oil shale, light-olive-brown, even with trace looped and streaked bedding, very competent; trace scattered bleeding asphaltic tuff blebs; trace pyritic tuff streaks; several scattered medium-brown oil-shale stringers; marly; a 0.4 foot zone of irregular gray, pyritic tuff stringers at 2,289.8 feet; a 0.1 foot asphaltic tuff bleb at 2,290.4 feet
2293.0-2296.2	Oil shale, marly, light-gray to light-brownish gray, even bedding, fairly competent; several scattered light- to medium-brown oil-shale stringers; several scattered medium-gray, pyritic tuff stringers and streaks; a 0.05 foot irregular, asphaltic tuff stringer at 2,293.2 feet
2296.2-2298.1	Oil shale, light-olive-brown, even with trace looped and irregular bedding, very competent; marly; a 0.1 foot asphaltic tuff stringer at 2,297.0 feet; several scattered medium-brown oil-shale stringers; trace gilsonite streaks; trace pyritic tuff streaks
2298.1-2300.2	Marlstone, light-gray, massive with trace even bedding, competent; trace kerogen; trace gilsonite streaks; trace light-brown oil-shale stringers; a 0.35 foot light-brown to light-gray asphaltic tuff band at 2,299.1 feet; trace pyrite blebs; a 0.1 foot dark-gray, pyritic tuff stringer at 2,300.2 feet
2300.2-2301.8	Oil shale, marly, light-grayish-brown, massive with streaked and trace even bedding, very competent; trace gilsonite streaks; few scattered pyrite streaks and blebs; a 0.1 foot light-brown tuff band at 2,301.7 feet; few scattered medium-brown oil-shale stringers
2301.8-2304.1	Oil shale, light- to medium-brown, even bedding, very competent; slightly darker from 2,301.8 to 2,303.0 feet; a 0.05 foot asphaltic tuff blebs at 2,302.1 and 2,302.6 feet; several scattered medium-gray irregular, pyritic tuff stringers and blebs; abundant dark-brown oil-shale stringers
2304.1-2308.5	Oil shale, marly, light-gray to light-grayish-brown, massive and even bedding, competent; abundant medium-brown oil-shale stringers; trace gilsonite streaks; abundant light- to medium-gray pyritic tuff streaks and stringers; a 0.02 foot pyritic tuff stringer at 2,307.3 feet





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2308.5-2309.5	Oil shale, medium- to dark-brown, even, irregular and streaked bedding, very competent; abundant dark-brown to black oil-shale stringers; trace gilsonite streaks; trace buff marly stringers
2309.5-2317.5	Marlstone, light-gray, massive with trace even bedding, fairly competent; trace kerogen; few scattered light- to medium-brown oil-shale stringers; a 0.02 foot irregular, asphaltic tuff stringer at 2,310.8 feet; several scattered gilsonite streaks and stringers; a 0.05 foot irregular, light-gray tuff band at 2,317.4 feet
2317.5-2319.9	Oil shale and tuff interbedded. Oil shale, medium-brown to medium-gray, even, looped, wavy and contorted bedding, competent; abundant dark-brown oil-shale stringers; tuff, abundant gray, irregular tuff stringers
2319.9-2327.1	Oil shale, marly, light-grayish-brown, even and streaked bedding, fairly competent; abundant irregular, pyritic tuff streaks, stringers and blebs; a 0.05 foot irregular asphaltic tuff band at 2,323.3 feet; few scattered medium- to dark-brown oil-shale stringers. TOP OF "B GROOVE AT 2,323 FEET
2327.1-2333.1	Marlstone, light-gray to light-gray-brown, even and massive bedding, competent; trace kerogen; abundant scattered light-brown oil-shale stringers; a 1.0 foot asphalt filled fracture at 2,227.0 feet; a 0.02 foot gray tuff stringer at 2,232.3 feet; trace pyritic tuff stringers
2333.1-2338.4	Oil shale, marly, light-brownish-gray, even bedding, competent; several scattered medium-brown oil-shale stringers; few scattered pyritic tuff stringers
2338.4-2347.8	Marlstone, light- to medium-gray, massive with trace even bedding, competent; trace kerogen; several scattered light- to medium-brown oil-shale stringers; abundant scattered light-gray pyritic tuff stringers; trace scattered gilsonite streaks; a 0.15 foot bleeding asphaltic tuff band at 2,347.8 feet
2347.8-2358.1	Marlstone, silty, light-gray, massive with trace even bedding, very hard and brittle, very competent; trace scattered light-brown oil-shale stringers; abundant very fine grained silty material disseminated in core; a 0.2 foot zone of slightly silty marlstone at 2,351.3 feet and a 0.6 foot zone at 2,352.1 feet; a 0.15 foot asphaltic tuff band at 2,357.1 feet





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2358.1-2389.1	Marlstone, light-gray, massive with trace even bedding, hard, brittle, fairly competent; trace kerogen; few scattered light- to medium brown oil-shale stringers; several scattered light-bluish-gray granular, analcitized tuff stringers; few scattered pyrite streaks and stringers; trace gilsonite streaks at 2,367.5, 2,369.0, and 2,370.8 feet; fracture at 45 to 65 degrees filled with a sticky asphaltic resin; drill induced rubble from 2,376.0 to 2,378.7 feet
2389.1-2406.8	Oil shale, light-gray-brown to light-olive-brown, even bedding, competent; several scattered pyritic tuff streaks and stringers; a 0.15 foot light-brown tuff band at 2,400.5 feet, a 0.1 foot tuff band at 2,401.5 feet; a 0.15 foot light-brown tuff band and a 0.05 foot irregular pyritic tuff bleb at 2,404.2 feet; slightly marly; few scattered medium-brown oil-shale stringers
2406.8-2416.7	Marlstone, light-gray, massive with trace even bedding, competent; trace kerogen; few scattered light-brown oil-shale stringers; several scattered light-bluish-gray granular, analcitized tuff streaks; few scattered pyrite streaks; a 0.15 foot light-bluish gray granular tuff band at 2,408.5 feet, trace asphaltic tuff streaks; a 0.1 foot irregular tan tuff band at 2,412.0 feet; a 0.1 foot light-brown tuff band at 2,414.3 feet
2416.7-2418.8	Oil shale, medium-mahogany-brown, even and irregular bedding, competent; trace pyritic tuff stringers, trace light-bluish gray granular, analcitized tuff stringers; a 0.15 foot irregular, asphaltic tuff band at 2,418.2 feet; abundant dark-brown to black oil-shale stringers and bands
2418.8-2424.9	Oil shale, marly, light-gray-brown, even with trace massive bedding, competent; abundant scattered medium-brown oil-shale stringers; trace pyritic tuff stringers; few scattered bleeding asphaltic tuff stringers; trace gilsonite streaks; a 0.2 foot medium- to dark-brown oil-shale band at 2,420.0 feet; a 0.6 foot light-bluish-gray granular, analcitized tuff band at 2,420.3 feet; a 0.6 foot zone of medium-mahogany-brown oil shale
2424.9-2435.3	Marlstone, light-gray, massive with trace even bedding, competent; trace kerogen; trace pyritic tuff stringers; several scattered light-brown oil-shale stringers





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2435.3-2438.5	Oil shale, light- to medium-brown, streaked and irregular bedding, competent; several scattered dark-brown oil-shale stringers; trace pyritic tuff streaks and stringers; a 0.1 foot irregular tan tuff band at 2,436.5 feet; a 0.3 foot light-brown granular tuff band bubbling gas at 2,437.3 feet; trace pyrite streaks
2438.5-2440.2	Oil shale, light-olive-brown, even bedding, very competent; few scattered medium-brown oil-shale stringers; slightly marly; trace pyritic tuff stringers
2440.2-2441.8	Oil shale, medium-brown to dark-mahogany-brown, even, looped and streaked bedding, competent; trace gilsonite streaks; trace irregular light-tan, granular tuff streaks and blebs; a 0.05 foot bleeding asphaltic tuff stringer at 2,441.8 feet
2441.8-2442.7	Oil shale, light- to medium-olive-brown, even and contorted with trace massive bedding, very competent; 0.1 foot asphaltic tuff bleb at 2,442.0 feet; a 0.02 foot pyritic tuff stringer at 2,442.5 feet; trace pyritic tuff streaks
2442.7-2449.3	Oil shale, marly, light-grayish-brown, nearly massive with trace even bedding, competent; trace gilsonite streaks; several scattered pyritic tuff stringers; few scattered medium-brown oil-shale stringers; a 0.03 foot asphaltic tuff stringer at 2,446.0 feet; a 0.2 foot zone of irregular tuff stringers at 2,447.9 feet; a 0.5 foot band of medium- to dark-brown oil shale from 2,448.1 to 2448.6 feet
2449.3-2450.4	Oil shale, dark-mahogany-brown, even, streaked, looped and irregular bedding, competent; trace gilsonite streaks; trace irregular, light-tan tuff streaks and stringers
2450.4-2454.9	Oil shale, light- to medium-olive-brown, even with trace massive bedding, competent; several scattered pyritic tuff stringers; abundant dark-brown oil-shale stringers; few scattered buff marly streaks; several scattered tan tuff streaks and stringers; a 0.05 foot irregular, dark-brown tuff stringer at 2,454.2 feet
2454.9-2456.6	Oil shale, medium-olive-brown, massive with streaked bedding, competent; several scattered pyritic tuff stringers; a 0.03 foot pyritic tuff stringer at 2,455.8 feet; trace scattered asphaltic tuff streaks





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2456.6-2459.2	Oil shale, marly, light-grayish-brown to light-olive-brown, nearly massive with trace even bedding, competent; several scattered pyritic tuff streaks and stringers; few scattered medium-brown oil-shale stringers
2459.2-2460.7	Oil shale, medium-mahogany-brown, streaked, even, and massive bedding, competent; abundant dark-gray pyrite streaks and stringers; trace buff marly streaks
2460.7-2463.7	Oil shale, light-olive-brown, massive with trace even bedding, competent; few scattered pyrite streaks and stringers; few scattered pyritic tuff stringers; trace buff marly streaks; few scattered medium- to dark-brown oil-shale stringers
2463.7-2466.2	Oil shale, marly, light-grayish-brown, massive with trace even bedding, competent; abundant buff marly streaks and stringers; few scattered light- to medium-brown oil-shale stringers; trace pyrite stringers and streaks
2466.2-2469.7	Oil shale, medium-mahogany-brown, even with trace streaked and contorted bedding, very competent; abundant dark-brown oil-shale stringers; trace gilsonite streaks; several scattered pyrite streaks and stringers; a 0.15 foot zone of light-gray, irregular tuff stringers at 2,467.7 feet; a 0.05 foot asphaltic tuff bleb at 2,468.2 feet; a 0.05 foot light-brown, irregular tuff stringer at 2,468.3 feet
2469.7-2471.4	Oil shale, light-olive-brown, even with trace streaked bedding, very competent; abundant medium-brown oil-shale stringers; several scattered dark-gray, pyritic tuff streaks and stringers
2471.4-2472.4	Oil shale, dark-mahogany-brown, even, irregular and looped bedding, competent; trace gilsonite streaks; few scattered medium-brown oil-shale stringers; a 0.3 foot irregular, tan tuff stringer at 2,472.4 feet; a 0.03 foot dark-brown asphaltic tuff stringer at 2,472.1 feet
2472.4-2474.8	Oil shale, light-olive-brown, even with trace massive and streaked bedding, competent; several scattered light-gray pyritic tuff stringers; abundant medium- to dark-brown oil-shale stringers; trace asphalt streaks





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2474.8-2478.5	Oil shale, marly, light-gray-brown, massive with trace streaked and even bedding, competent; few scattered medium-brown oil-shale stringers; abundant irregular, medium-gray pyritic tuff streaks and stringers; trace gilsonite streaks
2478.5-2483.0	Marlstone, light-gray, massive and even bedding, fairly competent; trace kerogen; several scattered light- to medium-brown oil-shale stringers; abundant medium-gray pyritic tuff streaks and stringers; trace bleeding asphaltic tuff stringers
2483.0-2483.9	Oil shale, marly, light-grayish-brown, massive, competent; abundant medium-gray, pyritic tuff streaks and stringers; trace medium-brown oil-shale stringers; trace pyritic streaks
2483.9-2489.4	Marlstone, light-gray, massive with trace even bedding, competent; trace kerogen; trace pyrite streaks; several scattered medium-brown oil-shale stringers; a 0.45 foot zone of medium-brown oil shale at 2,487.9 feet; trace gilsonite streaks; a 0.55 foot zone of medium-brown oil shale at 2,488.8 feet
2489.4-2492.5	Oil shale, medium-grayish-brown to medium-olive-brown, even with streaked and irregular bedding, competent; several scattered light-tan tuff blebs and irregular stringers; abundant pyrite streaks and stringers; a 0.05 foot irregular bleeding asphaltic tuff bleb at 2,490.9 feet; a 0.03 foot pyrite bleb at 2,491.3 feet; few scattered dark-brown oil-shale streaks and stringers; slightly marly from 2,491.0 to 2,492.5 feet
2492.5-2493.7	Oil shale, light-olive-brown, even with trace massive bedding, competent; trace pyrite streaks; a 0.1 foot light-gray pyritic tuff band at 2,493.2 feet; trace medium-brown oil-shale stringers and laminae; slightly marly
2493.7-2497.6	Oil shale, medium- to dark-mahogany-brown, even, streaked, with trace irregular bedding, competent; abundant dark-brown to black oil-shale streaks and stringers; trace gilsonite streaks; trace finely disseminated tuff; a 0.5 foot band of dark-mahogany-brown to black oil shale at 2,496.6 feet; a 0.25 foot irregular light-grayish-tan, granular tuff band at 2,497.2 feet; a 0.05 foot irregular dark-brown asphaltic tuff stringer at 2,497.6 feet





# CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2497.6-2498.6	Oil shale, medium-mahogany-brown to medium-grayish-brown, even with trace irregular bedding, very competent; core grades from medium-mahogany-brown at 2,497.6 feet to medium-grayish-brown at 2,498.6 feet; a 0.1 foot irregular dark-brown, granular asphaltic tuff band at 2,498.1 feet; trace dark-brown oil-shale stringers
2498.6-2501.0	Oil shale, marly, light-olive-brown to buff, massive and even bedding, fairly competent; trace dark-brown oil-shale stringers; a 0.03 foot light-gray granular, analcitized tuff stringer at 2,498.8 feet; abundant buff marly streaks; trace light-bluish gray, granular analcitized tuff streaks and stringers
2501.0-2503.6	Marlstone, light-gray to buff, massive with trace even bedding, fairly competent; trace kerogen; few scattered dark-brown oil-shale stringers; trace gilsonite streaks; few scattered light-bluish-gray, granular analcitized tuff streaks and stringers
2503.6-2508.1	Oil shale, light- to medium-olive-brown, even with massive bedding, competent; trace gilsonite streaks; trace asphalt streaks; trace buff marly stringers; a 0.5 foot core loss from 2,505.5 to 2,506.0 feet
2508.1-2511.2	Oil shale, medium- to dark-mahogany-brown, even, irregular, contorted and looped with trace streaked bedding, competent; few scattered light-tan tuff blebs and streaks; trace buff marly streaks and stringers; a 0.05 foot bleeding asphaltic tuff bleb at 2,510.7 feet; trace gilsonite streaks
2511.2-2512.2	Oil shale, light- to medium-olive-brown, even with trace massive and streaked bedding, very competent; trace pyritic tuff streaks; few scattered dark-brown oil-shale stringers; trace gilsonite streaks
2512.2-2515.5	Marlstone, light-tan to buff, nearly massive with trace even bedding, competent; trace kerogen; few scattered medium-brown oil-shale stringers; trace light-bluish-gray granular, analcitized tuff streaks and stringers
2515.5-2520.5	Oil shale, marly, light-grayish-brown to light-olive-brown, even bedding, competent; few scattered medium- to dark-brown oil-shale stringers and laminae; trace gilsonite streaks; trace light-bluish-gray granular, analcitized tuff streaks





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2520.5-2521.6	Oil shale, light-olive-brown, even with trace massive bedding, competent; few scattered medium-brown oil-shale stringers; trace pyrite streaks; trace light-bluish-gray granular, analcitized tuff streaks and stringers; slightly argillaceous
2521.6-2524.2	Shale, dark-gray, massive with streaked and even bedding, competent; trace kerogen; several scattered light- to medium-brown oil-shale stringers; hard; brittle; few pyrite streaks
2524.2-2536.2	Marlstone, argillaceous, light-gray, massive with trace even bedding, competent; trace kerogen; few scattered medium-brown oil-shale stringers; high angle fracture cemented with asphalt at 2,525.5 and 2531.0 feet; trace light-bluish-gray granular, analcitized tuff streaks and stringers; trace pyrite streaks and stringers; grades to a very light-gray marly oil shale from 2,532.7 to 2,533.3 feet
2536.2-2540.0	Oil shale, marly, light-grayish-brown, massive with trace even bedding, competent; trace scattered medium-brown oil-shale stringers; abundant pyrite streaks and stringers; trace light-bluish-gray granular, analcitized tuff streaks and stringers; trace irregular asphaltic tuff stringers
2540.0-2552.8	Marlstone, light-gray, massive and even bedding, competent; trace kerogen; abundant finely disseminated pyrite streaks and stringers; trace medium- to dark-brown oil-shale stringers; trace pyritic tuff streaks; trace asphaltic tuff stringers; a 0.05 foot dark-brown, asphaltic tuff bleb at 2,541.5 feet; a 0.25 foot light-gray tuff band at 2,551.3 feet
2552.8-2554.5	Oil shale, marly, light-grayish-brown, even and streaked bedding, competent; several scattered medium- to dark-brown oil-shale stringers; abundant pyrite streaks; trace asphalt streaks
2554.5-2563.1	Marlstone, light-gray, massive with trace even and irregular bedding, competent; trace kerogen; several scattered pyrite streaks; trace light-bluish-gray granular, analcitized tuff streaks and stringers; trace bleeding asphaltic tuff stringers; abundant light-brown oil-shale stringers at 2,556.0 to 2,558.0 feet





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2563.1-2567.5	Oil shale, marly, light-grayish-brown, massive with even and streaked bedding, competent; abundant medium- to dark-brown oil-shale stringers from 2,563.1 to 2563.8 feet; trace asphaltic tuff blebs; 0.03 foot light-gray granular tuff stringers at 2,564.4 and 2,565.4 feet; a 0.05 foot dark-gray pyritic tuff stringer at 2,565.9 feet; a 0.05 foot bleeding asphaltic tuff band at 2,566.5 feet; several scattered pyrite streaks and stringers
2567.5-2573.5	Marlstone, light-gray to light-grayish-brown, massive and even bedding, competent; trace kerogen; several scattered pyrite streaks and stringers; abundant scattered medium-brown oil-shale stringers, slightly argillaceous
2573.5-2586.4	Oil shale, marly, light-grayish-brown, even with trace massive bedding, competent; abundant scattered medium- to dark-brown oil shale stringers; trace black altered pyrite streaks and stringers; abundant light-gray pyrite streaks, stringers, and blebs; trace light-bluish-gray granular, analcitized tuff streaks; slightly argillaceous; very marly from 2,579.3 to 2,580.6 feet; trace asphalt streaks; a 0.02 foot pyritic tuff stringer at 2,585.7 feet; a 0.1 foot band of medium- to dark-mahogany-brown oil shale at 2,586.0 feet.
2586.4-2590.1	Oil shale, light-olive-brown to medium-grayish-brown, even with trace irregular bedding, competent; several scattered pyrite streaks and stringers; trace buff marly streaks; trace finely disseminated white tuff
2590.1-2592.5	Oil shale, light- to medium-grayish-brown, even, irregular with trace looped and contorted bedding, competent; abundant pyrite; a 0.5 foot band of dark-mahogany-brown oil shale at 2,591.7 feet; several scattered dark-brown oil-shale stringers; trace bleeding asphaltic tuff streaks
2592.5-2595.5	Oil shale, marly, light-grayish-brown, even and massive bedding, competent; abundant pyrite streaks and stringers; few scattered medium-brown oil-shale stringers and laminae
2595.5-2606.0	Marlstone, light-gray to buff, massive and even bedding, competent; trace kerogen; several scattered medium-brown oil-shale stringers and laminae; a 0.4 foot zone of medium-brown oil shale at 2,596.0 feet; abundant pyrite streaks, stringers, and blebs; a 0.05 foot light- to medium-gray tuff stringer at 2,601.8 feet; a 0.03 foot asphaltic tuff stringer at 2,604.8 feet; a 0.05 foot light-brown granular tuff band at 2,605.4 feet





# CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2606.0-2612.5	Oil shale, marly, light=tan to light=olive=brown, even bedding, competent; several scattered medium= to dark= brown oil=shale stringers and laminae; abundant buff marly stringers and bands; several scattered pyrite streaks and stringers; trace irregular asphaltic tuff stringers; a 0.03 foot irregular pyrite stringer at 2,612.5 feet
2612.5-2615.2	Oil shale, light-olive-brown, even bedding, very competent; few scattered pyrite streaks and stringers; slightly marly; a 0.1 foot medium=brown asphaltic tuff band at 2,615.0 feet
2615.2-2616.2	Oil shale, marly, light-tan to light-grayish-brown, massive and even bedding, competent; trace medium= to dark=brown oil=shale stringers and laminae; few scattered pyrite streaks and stringers
2616.2-2618.5	Marlstone, light-tan to light-gray, massive with trace even bedding, very competent; trace kerogen; few scattered pyrite stringers; trace scattered light-tan oil=shale stringers; slightly argillaceous
2618.5-2623.0	Oil shale, marly, light= to medium=grayish=brown, even with trace massive and streaked bedding, competent; several scattered medium=brown oil=shale stringers; abundant light= to dark=gray pyrite streaks and stringers; slightly argillaceous; trace asphalt streaks
2623.0-2628.2	Marlstone, light=gray, massive, competent; trace kerogen, trace light= to medium=brown oil=shale stringers; abundant pyrite streaks and stringers; slightly argillaceous
2628.2-2630.8	Oil shale, marly, light-grayish=brown to light-olive=brown, even with trace massive and contorted bedding, competent; abundant pyrite streaks and stringers; few scattered irregular asphaltic tuff stringers and laminae; argillaceous
2630.8-2633.1	Oil shale, argillaceous, medium=grayish=brown, even and massive with trace streaked bedding, competent; few scattered pyritic tuff streaks; a 0.05 foot pyritic tuff stringer; trace gilsonite streaks
2633.1-2634.6	Oil shale, medium=olive=brown, even with trace streaked bedding, competent; trace asphalt streaks; a 0.15 foot medium-gray granular tuff band at 2,633.1 feet; a 0.45 foot medium-gray granular tuff band at 2,634.0 feet





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2634.6-2640.6	Oil shale, marly, light-grayish-brown, even with trace streaked bedding, competent; several scattered medium-brown oil-shale stringers; trace bleeding asphaltic tuff streaks; abundant buff marly stringers and laminae; several scattered pyrite streaks and stringers; slightly argillaceous
2640.6-2646.6	Marlstone, light-gray to light-gray-buff, massive with trace even bedding, competent; abundant finely disseminated pyrite; trace light-brown oil-shale streaks and stringers; trace pyrite streaks and stringers; slightly argillaceous
2646.6-2653.0	Oil shale, marly, argillaceous, light-tan to light-grayish-brown, nearly massive with trace even and streaked bedding, fairly competent, trace kerogen; abundant scattered dark-gray pyrite streaks and stringers; trace medium- to dark-brown oil-shale stringers and laminae; a 0.03 foot medium-gray pyritic tuff stringer at 2,650.4 feet; a 0.02 foot irregular pyritic tuff bleb at 2,650.8 feet
2653.0-2656.0	Marlstone, argillaceous, light-gray to light-gray-buff, massive with trace even bedding, fairly competent; trace kerogen; trace light-gray oil-shale stringers; trace pyrite streaks and stringers
2656.0-2658.8	Oil shale, light-olive-brown, even bedding, competent; abundant medium-brown oil-shale stringers and laminae; slightly argillaceous; slightly marly; few scattered pyrite streaks and stringers
2658.8-2676.0	Marlstone, light-gray to buff, massive with trace even and streaked bedding, fairly competent; trace kerogen; several scattered pyrite streaks and stringers; few scattered light-brown oil-shale streaks and stringers; slightly argillaceous; a 0.6 foot band of medium-grayish-brown oil shale from 2,660.4 to 2,661.0 feet; a 0.02 foot irregular dark-brown asphaltic tuff stringer at 2,661.4 feet; fairly abundant light-gray granular tuff streaks and stringers from 2,662.4 to 2,662.9 feet; a 0.3 foot medium-brown granular tuff band at 2,663.2 feet; abundant finely disseminated pyrite; a 0.75 foot zone of medium- to dark-grayish-brown oil shale from 2,670.2 to 2,670.9 feet; a 0.02 foot pyritic tuff stringer at 2,673.0 feet; slightly silty





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2676.0-2679.6	Oil shale, marly, light-grayish-brown to light-olive-brown, even bedding, competent; several scattered medium-brown oil-shale stringers and laminae; abundant pyrite streaks, stringers, and blebs; trace pyritic tuff streaks; slightly argillaceous
2679.6-2687.9	Marlstone, light-gray, massive with trace even bedding, competent; very hard; slightly brittle; argillaceous; slightly silty; abundant scattered pyrite streaks and stringers; a 0.02 foot medium-gray pyrite stringer at 2,685.2 feet
2687.9-2689.9	Oil shale, medium-mahogany-brown, even, streaked and irregular bedding, competent; few scattered buff marly streaks and stringers; trace light-brown asphaltic tuff blebs; trace pyrite streaks and stringers; a 0.05 foot medium-gray granular tuff stringer at 2,689.6 feet; marly from 2,689.3 to 2,689.9 feet.
2689.9-2692.5	Marlstone, light-gray, massive, very hard, very competent; slightly silty; abundant finely disseminated tuff; several scattered light-bluish-gray granular, analcitized tuff streaks and stringers
2692.5-2695.0	Oil shale, marly, light-grayish-brown, massive with trace even bedding, competent, trace kerogen; few scattered light-brown oil-shale laminae; trace scattered pyrite streaks and stringers
2695.0-2697.5	Oil shale, medium- to dark-mahogany-brown, even and streaked bedding, competent; several scattered pyrite streaks and stringers; trace black altered pyrite streaks and stringers
2697.5-2707.1	Marlstone, tan to buff, massive with trace even and streaked bedding, fairly competent; trace kerogen; trace scattered light-brown oil-shale stringers and laminae; abundant pyrite streaks and stringers; abundant light-gray granular tuff streaks and stringers; slightly argillaceous; a 0.05 foot dark-gray pyritic tuff band at 2,705.3 feet; a high-angle open to closed fracture from 2,699.0 to 2,704.4 feet; a 0.03 foot bleeding asphaltic tuff stringer at 2,706.3 feet





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2707.1-2709.1	Oil shale, medium- to dark-mahogany-brown, even with streaked, irregular, contorted, and looped bedding, competent; several scattered medium- to dark-brown oil-shale stringers and laminae; abundant black oil-shale stringers and laminae; trace buff marly streaks and stringers; a 0.05 foot dark-gray, pyritic tuff stringer at 2,707.5 feet; trace pyrite streaks and blebs
2709.1-2714.5	Oil shale, marly, light-grayish-brown, even with trace massive bedding, competent; several scattered medium-gray pyrite streaks and stringers; moderately abundant finely disseminated tuff; slightly argillaceous
2714.5-2717.0	Oil shale, dark-mahogany-brown to black, even, streaked, contorted, irregular, and looped bedding, competent; low density; several scattered dark-brown tuff blebs and streaks, bubbling gas; trace pyrite streaks
2717.0-2719.2	Oil shale, medium-grayish-brown, even bedding, very competent; several scattered dark-brown to black oil-shale stringers and laminae; trace pyrite streaks; trace buff marly streaks and stringers
2719.2-2721.1	Marlstone, light-gray to tan, massive with trace even bedding, competent; trace kerogen; few scattered light-brown oil-shale stringers and laminae; several scattered pyrite streaks and stringers
2721.1-2723.5	Oil shale, medium- to dark-grayish-brown, even with trace streaked bedding, competent; trace asphaltic tuff streaks and blebs; trace asphalt streaks
2723.5-2727.1	Marlstone, light-gray to tan, massive, competent, very hard, brittle; trace kerogen; a 0.3 foot medium- to dark-gray tuff band at 2,725.0 feet; trace light-brown oil-shale stringers; trace pyrite streaks and stringers
2727.1-2729.4	Oil shale, marly, light-grayish-brown, even with massive and irregular bedding, competent; several scattered pyrite streaks; a 0.1 foot granular tuff band at 2,729.2 feet; few scattered light-brown tuff streaks and blebs
2729.4-2731.1	Oil shale, medium-grayish-brown, even bedding, competent; abundant dark-brown oil-shale stringers and laminae; trace pyrite streaks and blebs





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2731.1-2734.1	Oil shale, marly, medium-grayish-brown, massive, even and streaked bedding, very competent; trace medium-brown oil-shale stringers and laminae; abundant pyrite streaks and stringers; trace black altered pyrite streaks
2734.1-2735.1	Oil shale, medium-brown, even bedding, competent; trace pyrite streaks; slightly argillaceous
2735.1-2742.8	Marlstone, tan to buff, massive with trace even bedding, competent; trace kerogen; several scattered medium-brown oil-shale stringers and laminae; a 0.1 foot zone of irregular, brownish-gray tuff stringers at 2,741.8 feet; a 0.05 foot light-gray tuff bleb at 2,740.0 feet; few scattered pyrite streaks and stringers
2742.8-2751.8	Oil shale, medium-brown to medium-grayish-brown, even and massive bedding, competent; several scattered buff marly bands; abundant pyrite streaks and stringers; a 0.6 foot zone of medium- to dark-brown oil shale at 2,746.0 feet
2751.8-2753.8	Marlstone, tan to buff, massive with trace even bedding, very competent; trace kerogen; few scattered, light-brown oil-shale stringers and laminae; trace pyrite streaks; a 0.15 foot light-gray, granular tuff band at 2,753.8 feet
2753.8-2759.5	Oil shale, medium-mahogany-brown, even with trace streaked bedding, competent; several scattered, medium- to dark-gray pyrite stringers and streaks; a 0.1 foot light-brown granular tuff bleb at 2,755.7 feet
2759.5-2762.5	Marlstone, tan to buff, massive with trace even bedding; competent; trace kerogen; few scattered light-brown oil-shale stringers and laminae; abundant pyrite streaks and stringers
2762.5-2764.2	Oil shale, medium- to dark-grayish-brown, even bedding, competent; several scattered pyrite streaks and stringers; trace light-gray granular, irregular tuff streaks and stringers
2764.2-2765.5	Marlstone, buff, massive, competent; trace pyrite streaks
2765.5-2768.0	Oil shale, medium- to dark-mahogany-brown, even, streaked, contorted, looped, and irregular bedding, very competent; several scattered buff marly streaks and stringers; trace scattered pyrite streaks and stringers





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2768.0-2771.1	Marlstone, light-gray to tan, massive with trace streaked bedding, competent; trace kerogen; few scattered light-brown, oil-shale streaks and stringers; abundant finely disseminated granular tuff; several scattered dark-gray pyrite streaks, stringers, and blebs
2771.1-2774.7	Oil shale, light olive brown to light-grayish-brown, even and streaked with trace massive bedding, competent; abundant buff marly streaks and stringers; several scattered pyrite streaks, stringers, and blebs
2774.7-2787.4	Marlstone, light-tan to buff, massive, competent, hard, brittle; trace pyrite streaks; a 0.9 foot band of medium- to dark-grayish-brown oil shale at 2,780.6 feet; fair amount of finely disseminated tuff
2787.4-2788.4	Oil shale, medium-grayish-brown, even bedding, competent; a 0.10 foot irregular dark-gray granular tuff band at 2,787.4 feet; a 0.15 foot buff marly band at 2,788.0 feet; trace scattered pyrite streaks and stringers
2788.4-2792.1	Marlstone, light-gray to light-tan, massive, very hard, competent; fairly abundant finely disseminated tuff; trace light-brown oil-shale streaks and stringers
2792.1-2797.0	Oil shale, medium- to dark-mahogany-brown, even, streaked and irregular bedding, competent; several scattered pyrite streaks and stringers; trace buff marly streaks; a 0.05 foot tan tuff band at 2,794.0 feet; abundant dark-brown oil-shale stringers and laminae
2797.0-2799.2	Marlstone, light tan to buff, massive with trace even bedding, very hard, competent; abundant finely disseminated tuff; several scattered pyrite streaks; a high-angle fracture sealed with asphalt at 2,798.5 feet
2799.2-2808.2	Oil shale, medium-mahogany-brown to medium-grayish-brown, even bedding, competent; several scattered pyrite streaks, stringers, and blebs; trace asphalt streaks; trace buff marly streaks and stringers
2808.2-2811.0	Oil shale, light- to medium-grayish-brown, even bedding, competent; several scattered dark-gray, pyrite streaks and stringers; slightly argillaceous
2811.0-2819.2	Oil shale, marly, light-tan to light-brownish-gray, even with trace massive bedding, competent; several scattered pyrite streaks; abundant buff marly stringers and bands; slightly argillaceous; trace asphaltic tuff blebs





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2819.2-2836.0	Marlstone, light-gray, massive with trace even bedding, competent; very hard; trace kerogen; several scattered 0.05 to 0.10 foot light-gray granular tuff bands; a 0.10 foot medium-brown asphaltic tuff bleb at 2,822.5 feet; argillaceous; trace pyrite streaks; fairly abundant finely disseminated pyrite; few scattered light-brown, irregular asphalt streaks and stringers; a 0.20 foot zone of medium- to dark-brown oil-shale stringers at 2,835.6 feet
2836.0-2837.5	Oil shale, marly, light-brown to tan, massive with trace even bedding, very competent; trace pyrite streaks; trace light-brown oil-shale stringers
2837.5-2841.0	Oil shale, dark-mahogany-brown to black, streaked, irregular, contorted, looped, with trace even bedding, competent; trace scattered buff marly streaks; trace pyrite streaks; fairly low density
2841.0-2842.1	Oil shale, light-olive-brown, even streaked, and contorted bedding, competent; abundant dark-brown oil-shale stringers and laminae; trace light-gray tuff blebs; several scattered buff marly streaks and stringers
2842.1-2844.8	Marlstone, light-tan to buff, massive with trace even bedding; competent; trace kerogen; few scattered light-brown oil-shale stringers and laminae; several scattered pyrite streaks and stringers; trace asphaltic resin on partings
2844.8-2847.9	Oil shale, dark-mahogany-brown, even and streaked bedding, competent; a 0.02 foot pyrite stringer at 2,845.8 feet; trace pyrite streaks; slightly argillaceous
2847.9-2849.0	Marlstone, tan to buff, massive, competent; trace light-brown oil-shale stringers; trace light-gray tuff streaks; argillaceous
2849.0-2851.7	Shale, light-grayish-green, massive, moderately hard, brittle, competent, slightly calcareous; asphalt common on fracture surfaces
2851.7-2861.7	Oil shale, argillaceous, light-grayish-brown, massive, competent; trace kerogen; trace light-brown oil-shale streaks and stringers; trace pyrite streaks and stringers; slightly calcareous; trace gilsonite and pyrite on partings





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2861.7-2864.2	Marlstone, light-gray, massive with trace even bedding, competent; trace kerogen; few scattered light-brown oil-shale stringers and laminae; trace pyrite streaks; slightly argillaceous
2864.2-2873.1	Oil shale, marly, light-grayish-brown to tan, even and massive bedding, competent; several scattered medium-brown oil-shale stringers and laminae; abundant pyrite streaks and stringers; a 0.40 foot light-gray granular tuff band at 2,865.1 feet; trace black altered pyrite streaks; slightly argillaceous; very marly from 2,870.1 to 2873.1 feet
2873.1-2874.3	Oil shale, medium- to dark-grayish-brown, even bedding, very competent; several scattered pyrite streaks and stringers; slightly argillaceous
2874.3-2875.6	Oil shale, marly, tan- to light-olive-brown, massive with trace even bedding, competent; trace dark-brown oil-shale stringers; trace pyrite streaks
2875.6-2877.0	Oil shale, dark-grayish-brown, even bedding, competent; argillaceous; trace pyrite streaks; abundant dark-brown to black oil-shale stringers and laminae
2877.0-2879.2	Marlstone, tan to buff, massive with trace even bedding, fairly competent; trace kerogen; trace scattered light-brown oil-shale stringers and laminae; a 0.05 foot medium-gray granular tuff band at 2,878.7 feet and at 2,878.9 feet
2879.2-2882.1	Oil shale, dark-grayish-brown, even bedding, competent, slightly argillaceous; abundant black oil-shale stringers; trace pyrite streaks; a 0.65 foot light-tan marly band at 2,880.8 feet
2882.1-2888.2	Oil shale, medium-grayish-brown to light-brown, even with massive bedding, competent; several scattered dark-brown oil-shale stringers and laminae; abundant buff marly laminae and bands; abundant pyrite streaks and stringers; slightly argillaceous
2888.2-2894.1	Oil shale, dark-grayish-brown to medium-grayish-brown, even bedding, competent; abundant dark-brown to black oil-shale stringers and laminae; several scattered buff marly bands and laminae; abundant light-gray granular tuff streaks and blebs; abundant medium-gray pyrite streaks, stringers, and blebs; slightly argillaceous





# CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2894.1-2897.6	Oil shale, medium=grayish=brown, even bedding, competent; several scattered dark=brown oil=shale stringers and laminae; argillaceous; abundant pyrite streaks and stringers; a 0.25 foot bleeding asphaltic tuff band at 2,897.1 feet; a 0.15 foot light-gray tuff band at 2,897.5 feet
2897.6-2906.4	Oil shale, argillaceous, dark=grayish=brown to dark-gray, even and massive bedding, fairly competent; abundant dark=brown oil=shale stringers and laminae; several scattered pyrite streaks and stringers; a 0.05 foot light=brown granular tuff band at 2,902.7 feet
2906.4-2908.0	Oil shale, marly, light=tan to light=olive=brown, massive and irregular with trace even bedding, very competent; trace medium=brown oil=shale stringers and laminae; abundant finely disseminated tuff; trace pyrite streaks
2908.0-2910.7	Oil shale, dark=grayish=brown, even bedding, competent; trace pyrite streaks; slightly argillaceous
2910.7-2915.4	Marlstone, shaly, light-gray, massive with trace even bedding, competent; trace kerogen; trace scattered light=brown oil=shale stringers and laminae; trace pyrite streaks
2915.4-2916.5	Marlstone, light=tan to buff, massive, competent; abundant finely disseminated tuff; trace pyrite streaks; argillaceous
2916.5-2924.5	Oil shale, argillaceous, medium= to dark=grayish=brown, even with trace massive bedding, competent; a 0.15 foot light-gray tuff band at 2,919.2 feet; trace pyrite streaks; few scattered medium= to dark=brown oil=shale stringers and laminae
2924.5-2926.5	Marlstone, light-gray, massive, competent; hard; slightly argillaceous; trace pyrite streaks
2926.5-2929.7	Oil shale, argillaceous, medium= to dark=grayish=brown, even bedding, slightly competent; trace pyrite streaks; trace dark=brown to black tuff streaks and blebs
2929.7-2931.7	Marlstone, light=tan to buff, massive, very competent; trace kerogen; trace light=brown oil=shale stringers and laminae; trace gilsonite streaks; trace pyrite streaks





# CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
2931.7-2938.4	Oil shale, argillaceous, light- to medium-grayish-brown, even bedding, competent; trace pyrite streaks; trace dark-gray tuff stringers and streaks; trace gilsonite streaks
2938.4-2941.8	Marlstone, buff, massive, competent; hard; trace pyrite streaks; trace light-brown oil-shale stringers; abundant finely disseminated tuff
2941.8-2946.2	Oil shale, argillaceous, medium- to dark-grayish-brown, even bedding, competent; trace kerogen; few scattered light- to medium-brown oil-shale stringers and laminae; marly from 2,945.2 to 2,946.0 feet
2946.2-2981.2	Shale, silty, medium- to dark-gray, even and massive bedding, competent, hard; trace kerogen; trace scattered light-brown oil-shale stringers and laminae; trace pyrite streaks and stringers; a high-angle fracture at 2,947.0 feet coated with asphalt; slightly calcareous; trace gilsonite on partings; a 0.30 foot zone of irregular bleeding asphaltic tuff stringers at 2,977.7 feet; few scattered shaly, disked partings
2981.2-2992.0	Marlstone, argillaceous, light-tan to light-grayish-tan, massive with trace even bedding, competent; trace kerogen; trace scattered light-brown oil-shale stringers; trace pyrite streaks; a 0.30 foot light-brown granular tuff band at 2,990.1 feet; abundant scattered shale stringers and laminae
2992.0-2997.7	Shale, marly, light- to medium-grayish-brown, even with trace massive bedding, fairly competent; trace kerogen; several scattered light- to medium-brown oil-shale stringers and laminae; trace pyrite streaks
2997.7-3046.3	Shale, light- to medium-gray, massive with trace even bedding, competent; moderately hard, moderately calcareous; abundant disseminated tuff from 3,003.7 to 3,005.6 feet; abundant asphaltic resin; abundant silty stringers and finely disseminated silty material; numerous high-angle fractures with sticky asphaltic coating from 3,026.0 to 3,034.3 feet; numerous shaly and disked partings from 3,029.9 to 3,030.9 feet





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
3046.3-3052.0	Limestone, tan to buff, massive, moderately soft, very calcareous; abundant sticky, asphaltic coating on a 90 degree fracture from 3,046.5 to 3,047.2 feet; a light-gray shale bed from 3,048.6 to 3,049.1 feet; a medium-brown fine- to medium-grained sandstone bed from 3,049.1 to 3,050.0 feet; interval becomes very sandy from 3,051.7 to 3,052.0 feet
3052.0-3054.8	Sandstone, fine- to medium-grained, medium-grayish-brown, massive, very calcareous, moderately hard; few buff mudstone bands and stringers; abundant sticky asphaltic resin on fracture and parting surfaces; gradational contact
3054.8-3055.5	Siltstone, medium- to dark-gray, massive, very calcareous, moderately hard and brittle; abundant clay sized material
3055.5-3070.2	Shale, dark-gray, massive with even and irregular bedding; slightly calcareous; moderately hard and brittle; abundant sticky asphaltic resin; very silty in places; few scattered shaly and disked partings; a light-tan to buff limestone bed from 3,061.0 to 3,062.3 feet
3070.2-3077.2	Shale, silty, light- to medium-gray, wavy to irregular bedding, very competent; few scattered medium-olive-brown oil-shale streaks and stringers; trace light-gray tuff streaks, stringers, and bands
3077.2-3107.8	Shale, medium- to dark-gray, massive to even bedding, very competent; slightly calcareous; trace siltstone streaks and stringers; trace sticky asphaltic resin on core; abundant clay material; few scattered shaly, disked partings; becomes very limey from 3,097.1 to 3,099.0 feet
3107.8-3110.3	Limestone, tan to buff, massive with trace streaked bedding, very competent; moderately calcareous
3110.3-3112.5	Shale, light-gray, even with irregular bedding, very competent; slightly to moderately calcareous; abundant limestone streaks, stringers, and bands; trace medium-olive-brown oil-shale streaks and stringers
3112.5-3115.4	Sandstone, coarse to very coarse grained, tan- to light-gray, massive with trace irregular bedding, very competent; moderately calcareous; well-rounded grains; siltstone stringers and bands common; medium-gray tuff stringers and bands common





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
3115.4-3118.6	Tuff, light-gray, massive, very competent, very hard and brittle, slightly calcareous
3118.6-3129.0	Shale, medium- to dark-gray, even bedding, very competent, slightly to moderately calcareous, very hard and brittle; limestone streaks, bands, and beds common; slightly silty in places; trace medium-brown oil-shale streaks and stringers; trace light-gray tuff streaks and stringers; abundant light-gray tuff streaks and stringers from 3,126.0 to 3,127.4 feet
3129.0-3134.9	Limestone, tan to buff, massive with trace streaked and irregular bedding, very competent; moderately hard and brittle; moderately to very calcareous; possibly ostracodal; becomes sandy from 3,133.5 to 3,134.9 feet
3134.9-3147.7	Shale, medium- to dark-gray, massive to even bedding, very competent, moderately hard and brittle, slightly to moderately calcareous; a 0.20 foot medium-gray tuff band at 3,134.9 feet; light-gray tuff streaks and stringers common; slightly silty in places; interval becomes very sandy from 3,147.0 to 3,147.7 feet
3147.7-3150.5	Siltstone, light-gray, massive to irregular bedding, very competent, moderately calcareous, moderately hard and brittle; several scattered medium-gray tuff stringers
3150.5-3159.2	Shale and siltstone interbedded; shale, medium- to dark-gray, massive to even bedding, very competent, moderately calcareous, moderately hard and brittle; siltstone, light-gray, massive to irregular bedding, very competent, moderately hard and brittle; numerous light-gray tuff streaks and stringers
3159.2-3162.4	Siltstone, light-gray, massive to wavy bedding, very competent; moderately hard and brittle; moderately calcareous; abundant clay sized material; trace dark-gray shale streaks and stringers
3162.4-3164.8	Shale, medium- to dark-gray, even bedding, fairly competent, moderately hard and brittle, slightly calcareous; numerous light-gray siltstone streaks, stringers, and bands; interval highly broken from 3,162.4 to 3,163.2 feet
3164.8-3166.0	Siltstone, light-gray, massive with trace irregular bedding, very competent, moderately hard and brittle, moderately calcareous; abundant clay-sized material





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
3166.0=3169.5	Shale, silty, light- to medium-gray, massive with trace streaked and even bedding, very competent, moderately soft, moderately calcareous; abundant clay-sized material; a 0.10 foot band of medium-gray clay at 3,167.0 feet
3169.5=3186.3	Siltstone, light-grayish-brown, massive with trace irregular bedding, very competent, hard and brittle, slightly calcareous; a 0.30 foot dark-gray shale band from 3,170.2 to 3,170.5 feet; a 0.50 foot band from 3,174.3 to 3,174.8 feet; a 0.10 foot band at 3,175.7 feet; a 0.30 foot band from 3,176.0 to 3,176.3 feet; a 0.20 foot band at 3,177.8 feet; a 0.50 foot bed from 3,180.5 to 3,181.0 feet; a 0.20 foot band at 3,183.3 feet
3186.3=3195.7	Shale, medium- to dark-gray, massive to even bedding, fairly competent, moderately hard and brittle, slightly calcareous, slightly silty in places; few scattered light-gray siltstone bands
3195.7=3214.5	Siltstone and shale interbedded; siltstone, light-grayish-brown, massive with trace irregular bedding, competent, moderately hard, moderately calcareous; shale, medium- to dark-gray, massive with even and irregular bedding, competent, moderately hard and brittle, slightly calcareous; trace medium-olive-brown oil-shale streaks and stringers; abundant clay-sized material
3214.5=3225.5	Shale, medium-gray, massive to even bedding, very competent, moderately hard and brittle, slightly to moderately calcareous, slightly silty in places; clay-sized material common
3225.5=3230.0	Oil shale, light-olive-brown to light-gray-brown, even with trace irregular bedding, very competent; trace greenish-gray pyrite streaks and stringers; slightly silty in places; trace tan to buff tuff streaks and stringers
3230.0=3231.6	Oil shale, light- to medium-olive-brown, even with looped and irregular bedding, very competent; tan tuff streaks, stringers, and blebs common; trace tan marly streaks and claystones; trace greenish-gray pyritic tuff streaks
3231.6=3239.1	Sandstone, fine, medium, and coarse-grained banded, tan- to light-gray, massive to irregular bedding, very competent, poorly sorted, moderately hard, moderately to very calcareous; trace light-gray tuff stringers and bands; trace medium-brown oil-shale streaks and stringers; trace shale streaks and stringers





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
3239.1=3245.3	Shale, silty, light= to medium=gray, massive with trace even and irregular bedding, very competent, moderately calcareous; trace dark=olive=brown oil=shale streaks and stringers; light=gray siltstone streaks and stringers common; gilsonite=coated fossil fish on partings at 3,245.3 feet
3245.3=3253.9	Shale, medium= to dark=gray, massive to even bedding, competent, very hard and brittle, slightly to moderately calcareous; gilsonite coated fossils common on scattered shaly partings; trace medium=olive=brown oil=shale streaks and stringers
3253.9=3256.4	Siltstone, light=grayish=brown, massive to irregular bedding, very competent, moderately hard and brittle, slightly to moderately calcareous; a 0.10 foot band of coarse-grained dark=brownish=gray sandstone at 3,253.9 feet
3256.4=3266.0	Siltstone and shale interbedded; siltstone, light=grayish=brown, massive to irregular bedding, competent, moderately hard, moderately calcareous; shale, medium= to dark=gray, even to irregular bedding, competent, moderately hard, slightly calcareous; trace medium=olive=brown oil=shale streaks and stringers; some individual beds of siltstone and shale
3266.0=3269.3	Siltstone, light=grayish=brown, massive with trace streaked bedding, very competent, moderately hard and brittle, slightly to moderately calcareous; few shaly streaks
3269.3=3289.4	Shale, silty, medium=gray, massive with even and streaked bedding, fairly competent, moderately soft, slightly to moderately calcareous; numerous siltstone streaks, stringers, and bands; numerous soft clay stringers and bands; a light=gray massive siltstone bed from 3,274.1 to 3,274.9 feet; gilsonite coated fish fossils common on shaly partings
3289.4=3293.4	Siltstone, light=grayish=brown, massive with trace streaked bedding, competent, hard and brittle, slightly to moderately calcareous; numerous shaly streaks; very fragmented with high=angle fractures from 3,291.2 to 3,293.4 feet





CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
3293.4=3226.0	Shale, silty, medium= to dark=gray, massive with even bedding, fairly competent, moderately hard and brittle in places, soft in places, slightly to moderately calcareous; siltstone streaks, stringers and bands common; clay stringers and bands common; a few gilsonite coated fossils on shaly partings; siltstone increasing in abundance from 3,316.2 to 3,319.9 feet; few scattered clay bands; very fragmented from 3,320.2 to 3,323.9 feet
3226.0=3332.2	Shale, light= to medium=gray, massive to even bedding, very competent, slightly to moderately calcareous, fairly hard and brittle; trace siltstone; trace medium=brown oil= shale streaks and stringers; gradational contact
3332.2=3335.3	Oil shale, medium=olive=brown to medium=grayish=brown, even with trace looped bedding, competent, argillaceous; gray shaly stringers common; trace siltstone streaks; trace greenish=gray pyrite streaks
3335.3=3336.5	Oil shale, light=olive=brown to light=brown, even bedding, very competent, silty; medium=gray shaly stringers common
3336.5=3352.0	Shale, medium= to dark=gray, massive to even bedding, competent, moderately hard and brittle, slightly to moderately calcareous; possible trace kerogen in places; slightly silty in places; abundant shaly partings from 3,343.1 to 3,352.0 feet
3352.0=3357.6	Oil shale, medium= to dark=brown to dark=grayish=brown, massive with trace even and contorted bedding, slightly competent, slightly argillaceous; few scattered slickensides; trace gilsonite streaks; a fracture from 3,354.7 to 3,356.4 feet; abundant shaly partings
3357.6=3373.6	Oil shale interbedded with marlstone bands; oil shale, medium=brown to gray=brown, even with contorted and irregular bedding, fairly competent; marlstone, light=brown to buff; few scattered gilsonite streaks
3373.6=3376.7	Oil shale, marly, light=brown to grayish=brown, massive and even bedding with trace irregular, looped, and contorted bedding, competent; few scattered light=brown to buff marlstone streaks and stringers; a 0.10 foot band of light=gray papery shale at 3,373.8 feet; 0.10 foot band of medium=brown oil shale at 3,376.2 and at 3,376.6 feet





# CORE LITHOLOGY Coyote Wash #1--Continued

Feet	Description
3376.7=3412.6	Shale and siltstone interbedded; shale, light- to medium-gray, massive with trace even and contorted bedding, fairly competent; siltstone, light-gray, contorted with looped, irregular, and streaked bedding, competent; a 0.80 foot band of light- to medium-grayish-brown marly shale at 3,388.6 feet; gilsonite streaks and blebs common; sandy stringers and streaks common; a 0.20 foot light-grayish-brown medium-grained sandstone band at 3,379.6 feet; abundant shaly partings from 3,406.7 to 3,412.6 feet
3412.6=3424.2	Oil shale, medium-brown to grayish-brown, even with trace looped, contorted, and massive bedding, fairly competent; few scattered medium-gray pyritic tuff streaks and blebs; a 0.10 foot band of dark-gray asphaltic tuff stringers at 3,420.9 feet; few scattered light-brown to buff marlstone streaks and stringers, a 0.10 foot band of marlstone(?) at 3,421.5 feet; trace gilsonite streaks; a 0.60 foot band of medium- to dark-brown oil shale at 3,420.5 feet
3424.2=3428.5	Sandstone, medium- to coarse-grained, tan to buff, massive and even with trace contorted bedding, competent, well-cemented; a 0.60 foot band of buff siltstone at 3,424.6 feet; dark-gray to black asphalt streaks and stringers common; highly calcareous
3428.5=3429.9	Siltstone and sandstone interbedded; siltstone, light- to medium-gray, contorted, looped, and irregular bedding, very competent; sandstone, medium- to coarse-grained, light-brown to buff, contorted and curved bedding, very competent, well-cemented; abundant dark-gray to black asphalt streaks and stringers
3429.9=3440.7	Shale and siltstone interbedded; shale, light- to medium-gray to dark-gray, massive with trace even, streaked, and contorted bedding, competent; siltstone, light- to medium-gray, even and irregular bedding, competent; few scattered gilsonite and asphalt streaks, stringers, and blebs; a 0.80 foot buff- to light-gray fine- to medium-grained sandstone band at 3,437.9 feet; abundant medium- to dark-gray streaks and stringers
3440.7=3460.0	Siltstone, light- to medium-gray, contorted, streaked, looped and inclined bedding, competent; abundant medium- to dark-gray shaly streaks and stringers, a 0.3 foot band at 3,442.5 feet; 0.20 foot bands at 3,443.7 feet and 3,444.1 feet; trace gilsonite streaks and blebs; trace asphalt streaks
3460.0	Total Depth





U.S. Geological Survey		
Company		
Well No. Coyote Wash - 1		
State Utah	County Uintah	
T. 9 S.	R. 23 E.	S. 22

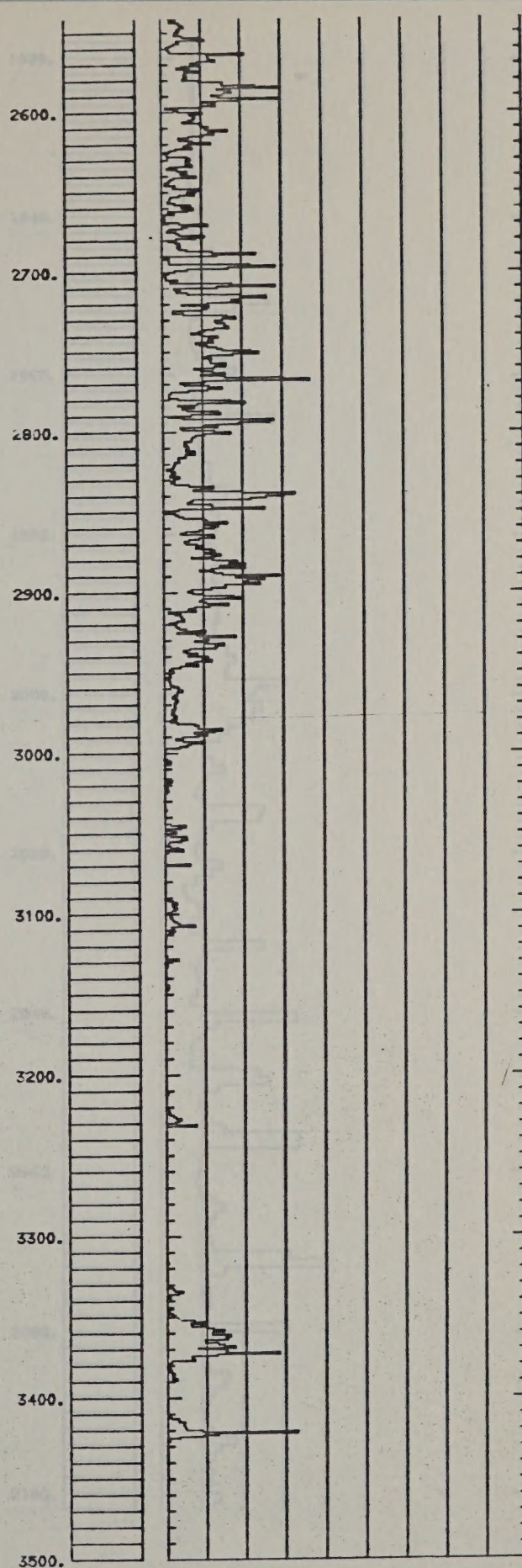
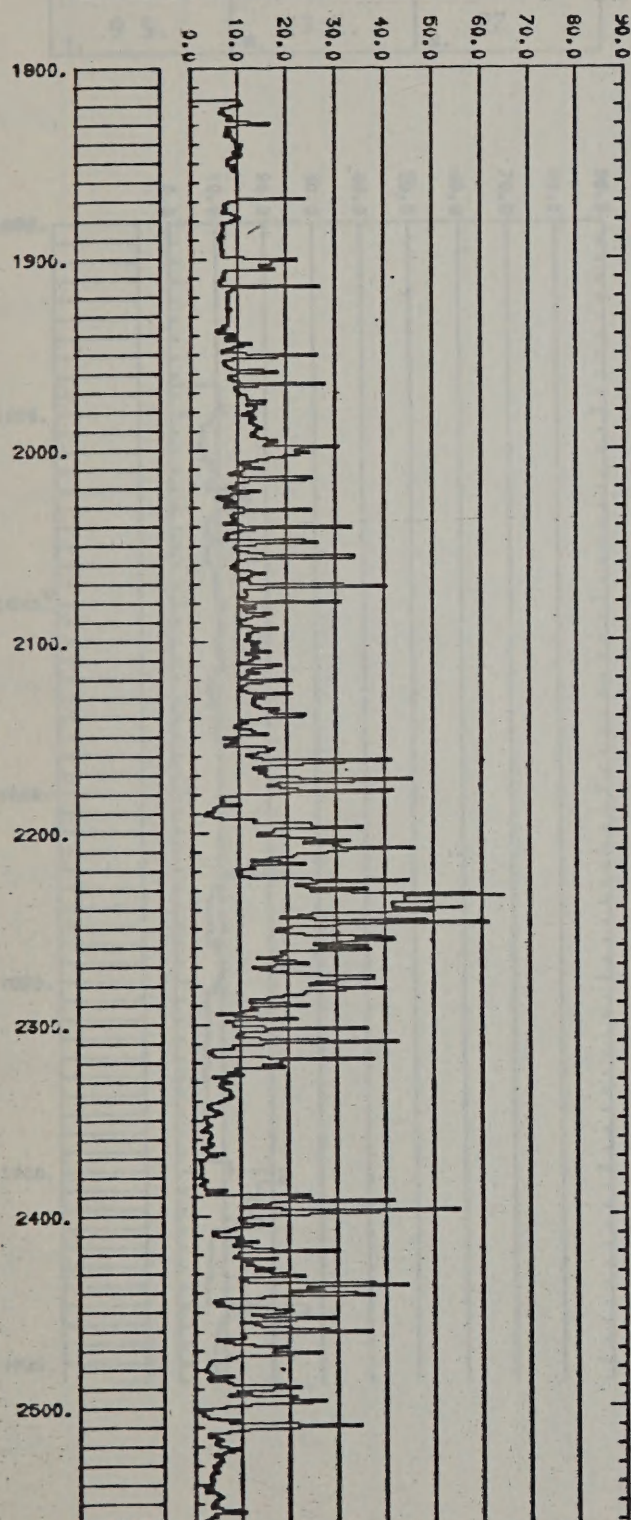


Figure 2: Oil-yield bar graph of the CW-1 drill hole from Fischer Assay analysis (in gallons of oil per ton); 1" = 100'





Company U.S. Geological Survey		
Well No. Coyote Wash - 1		
State Utah		County Uintah
T. 9 S.	R. 23 E.	S. 22

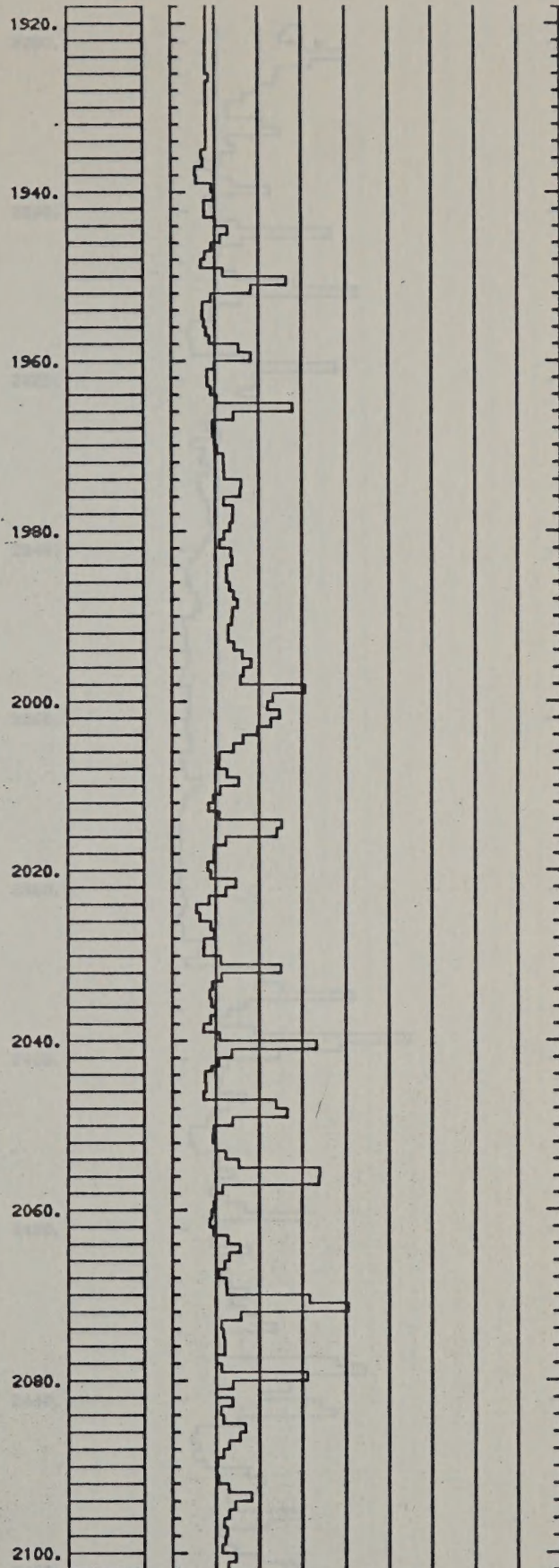
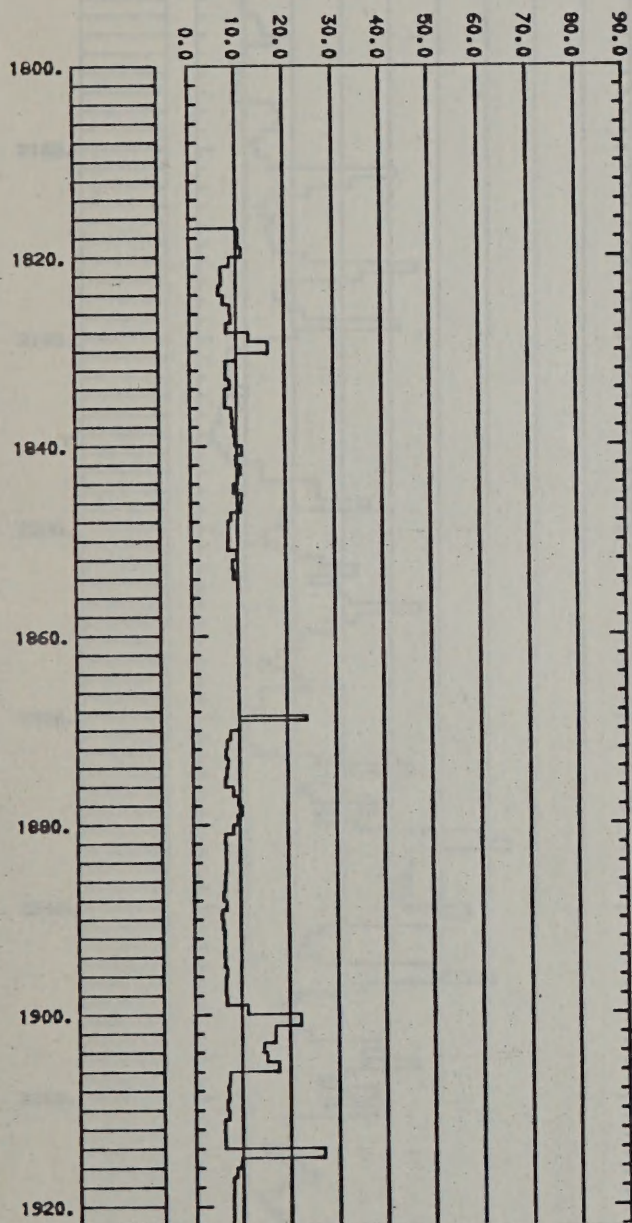


Figure 3: Oil-yield bar graph for the CW-1 drill hole from Fischer assay analysis (1" = 20')





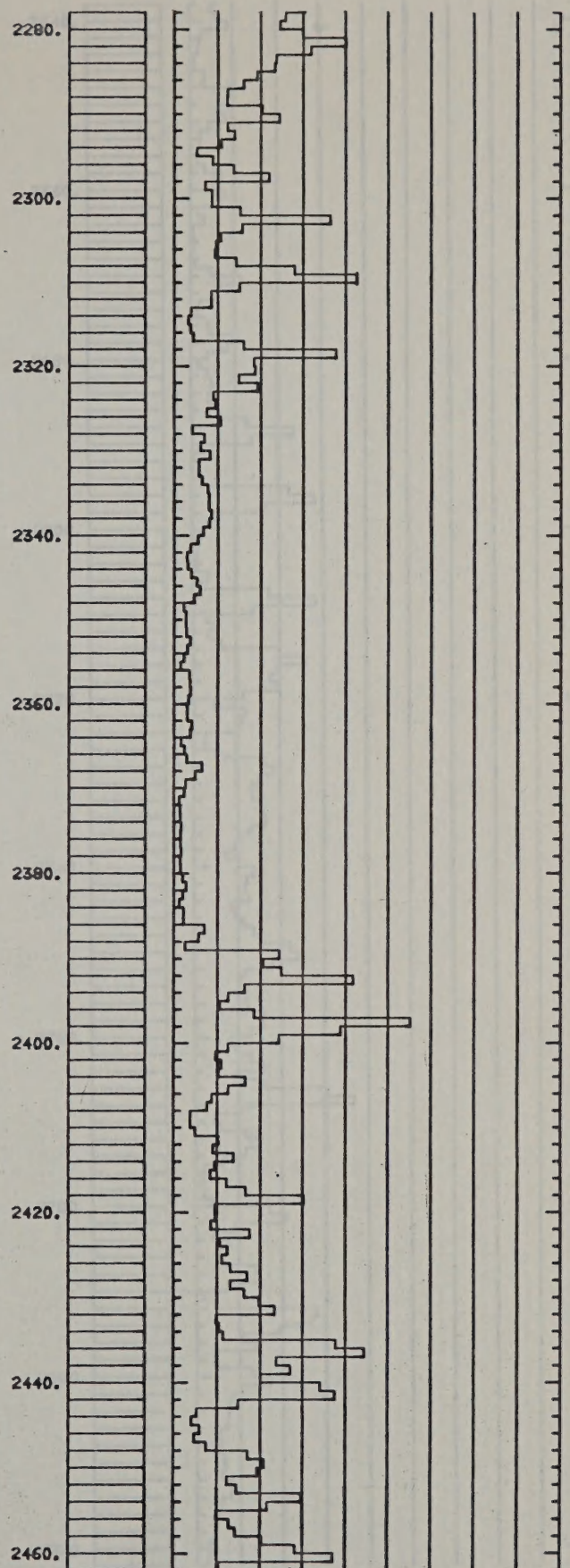
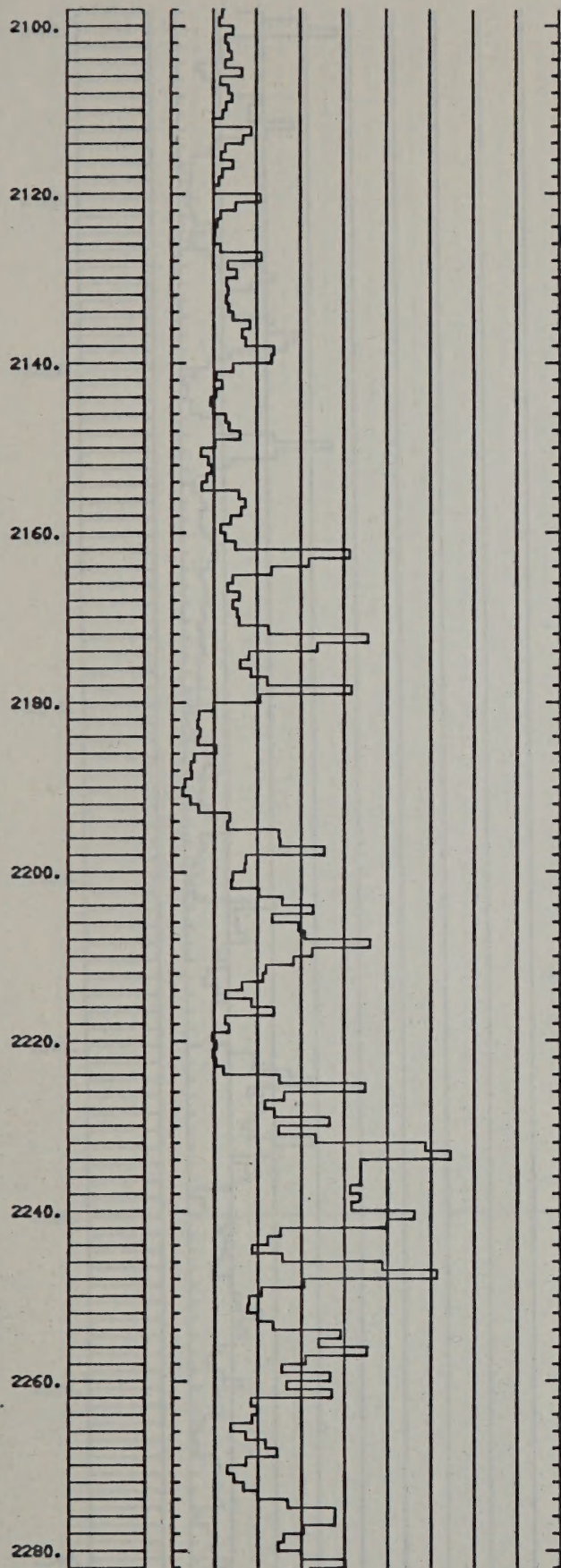


Figure 3: (continued)





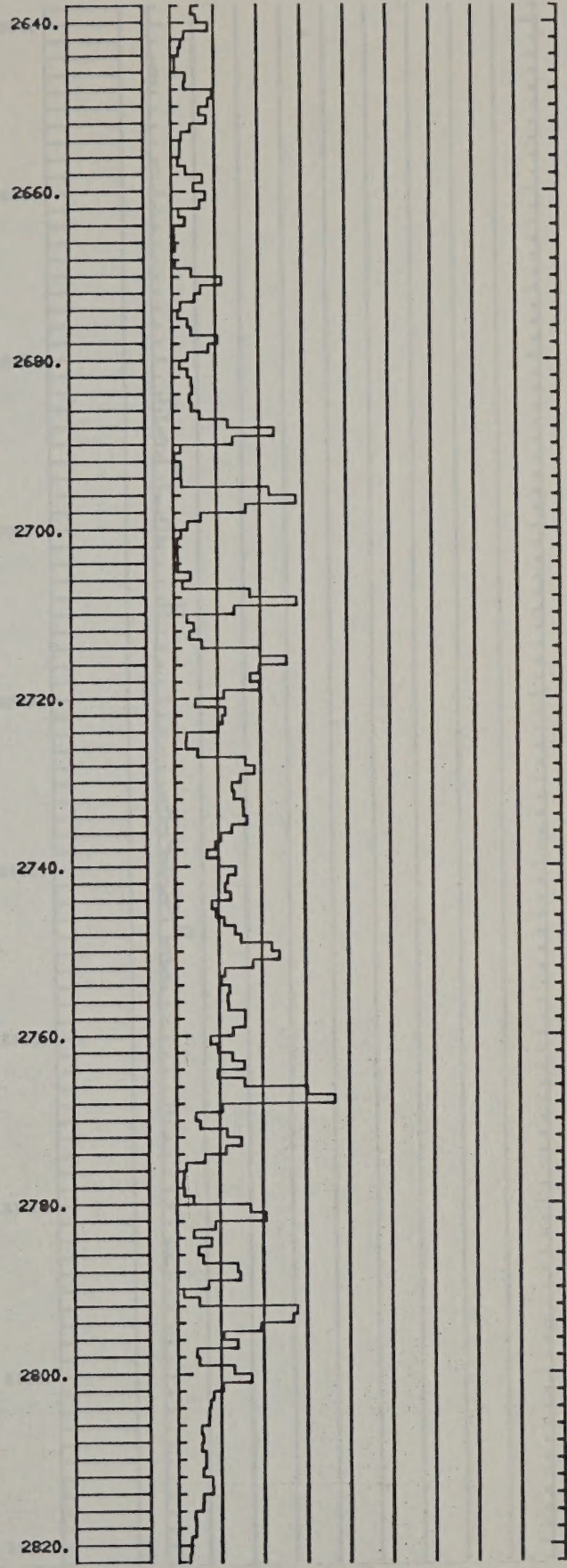
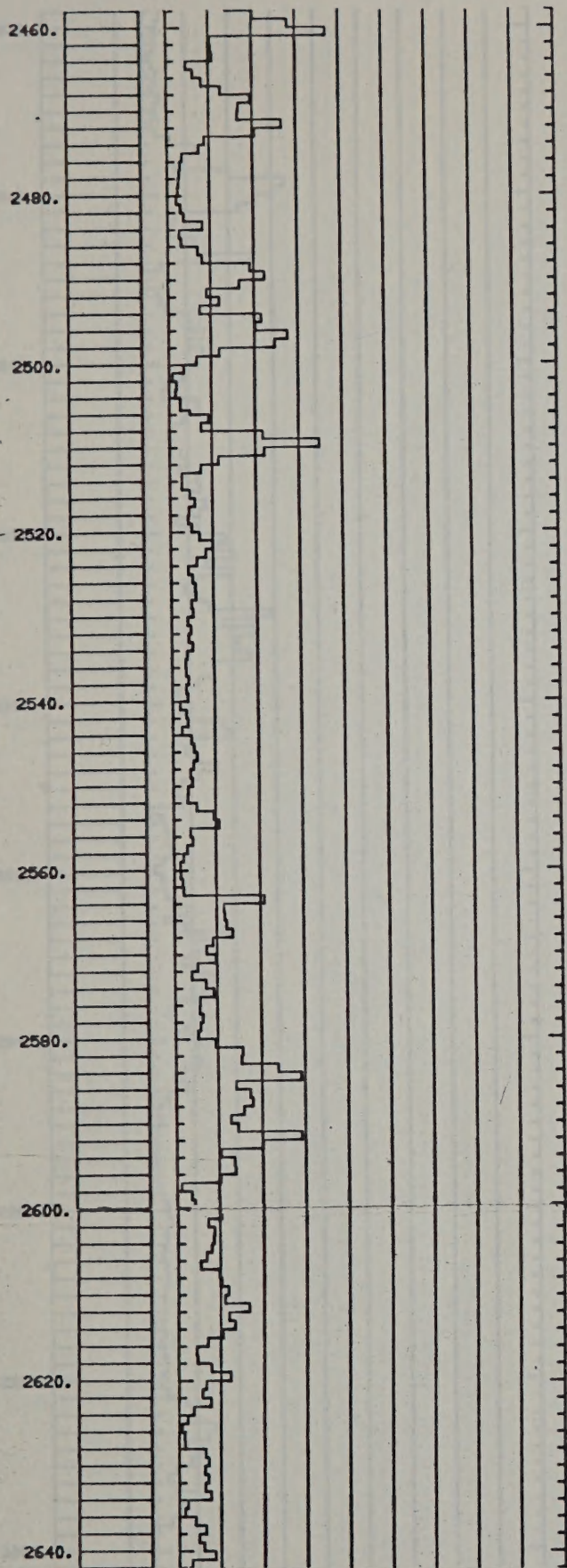


Figure 3: (continued)





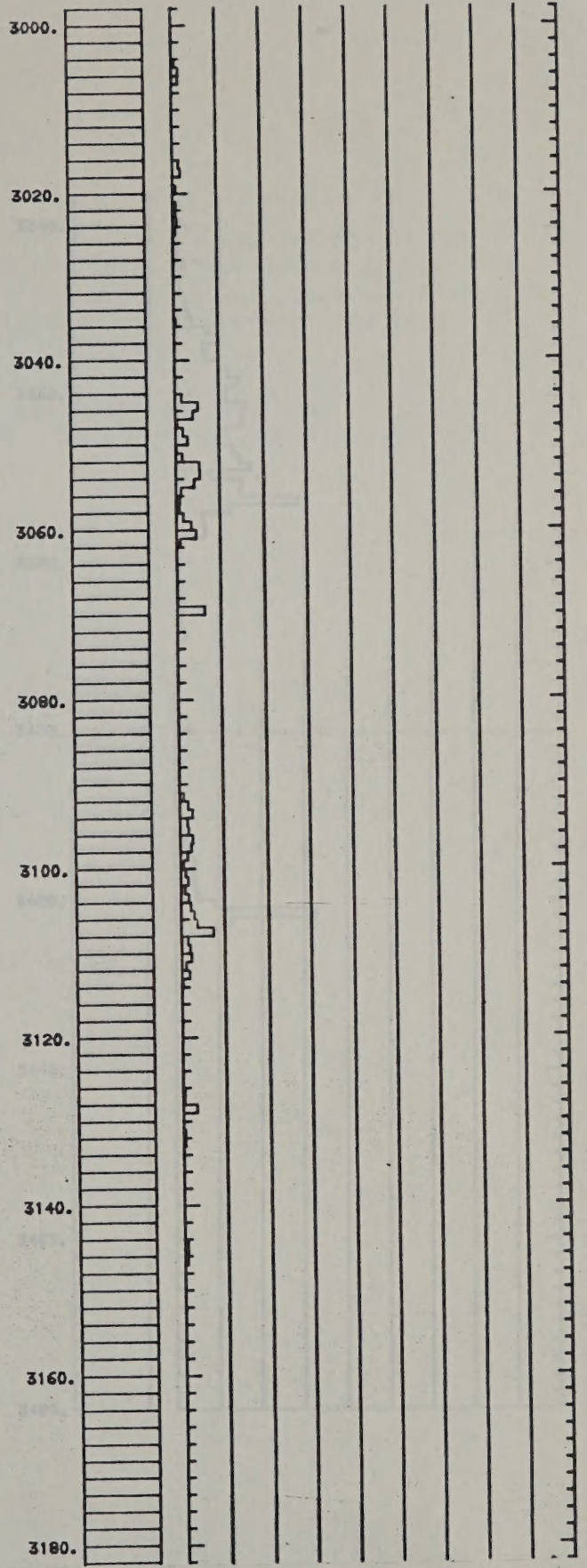
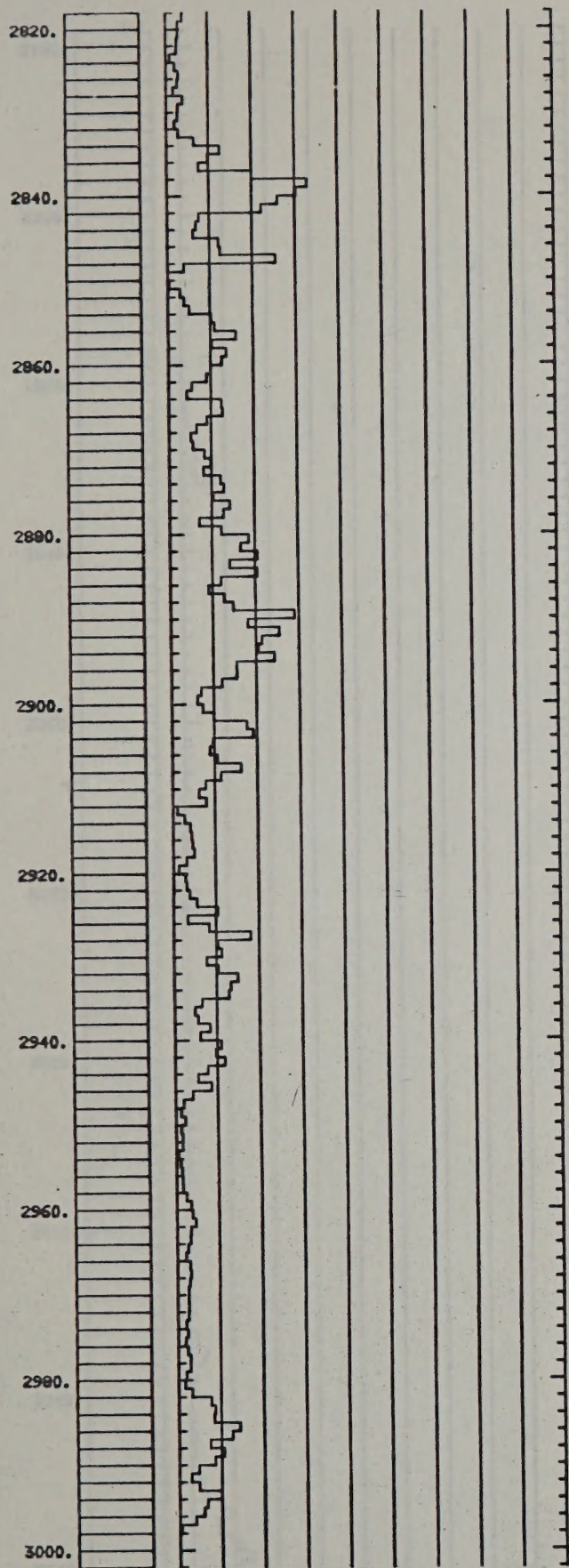


Figure 3: (continued)





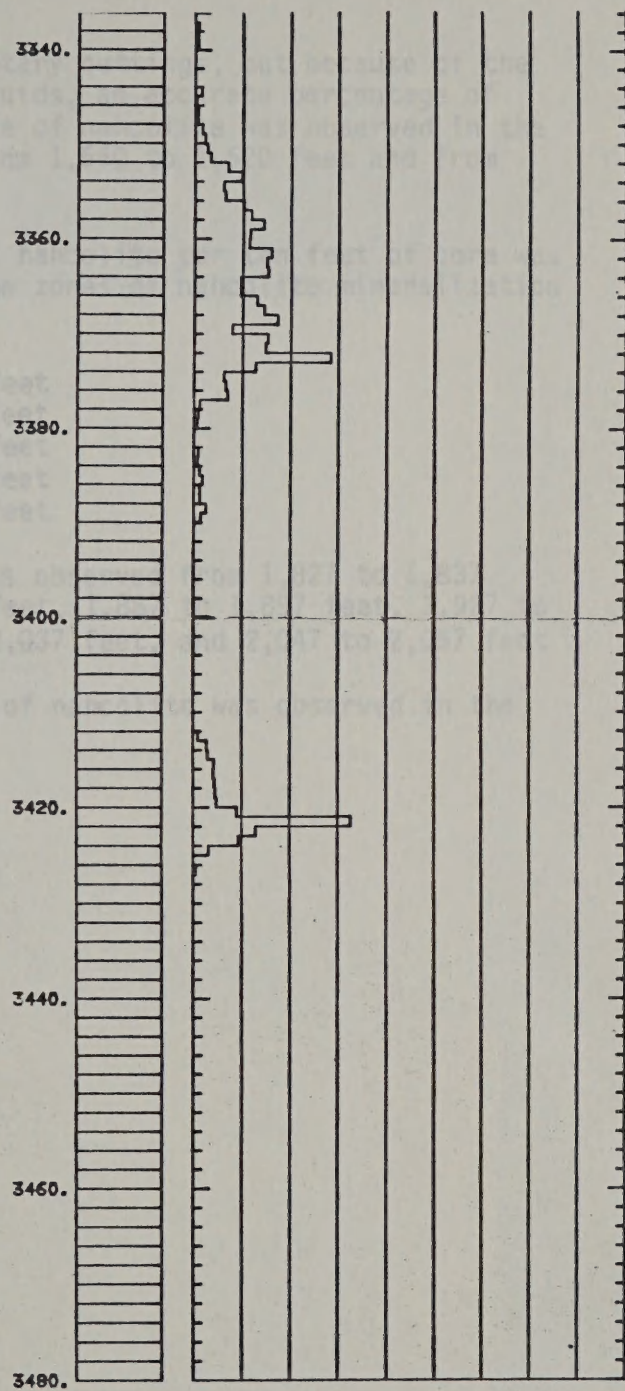
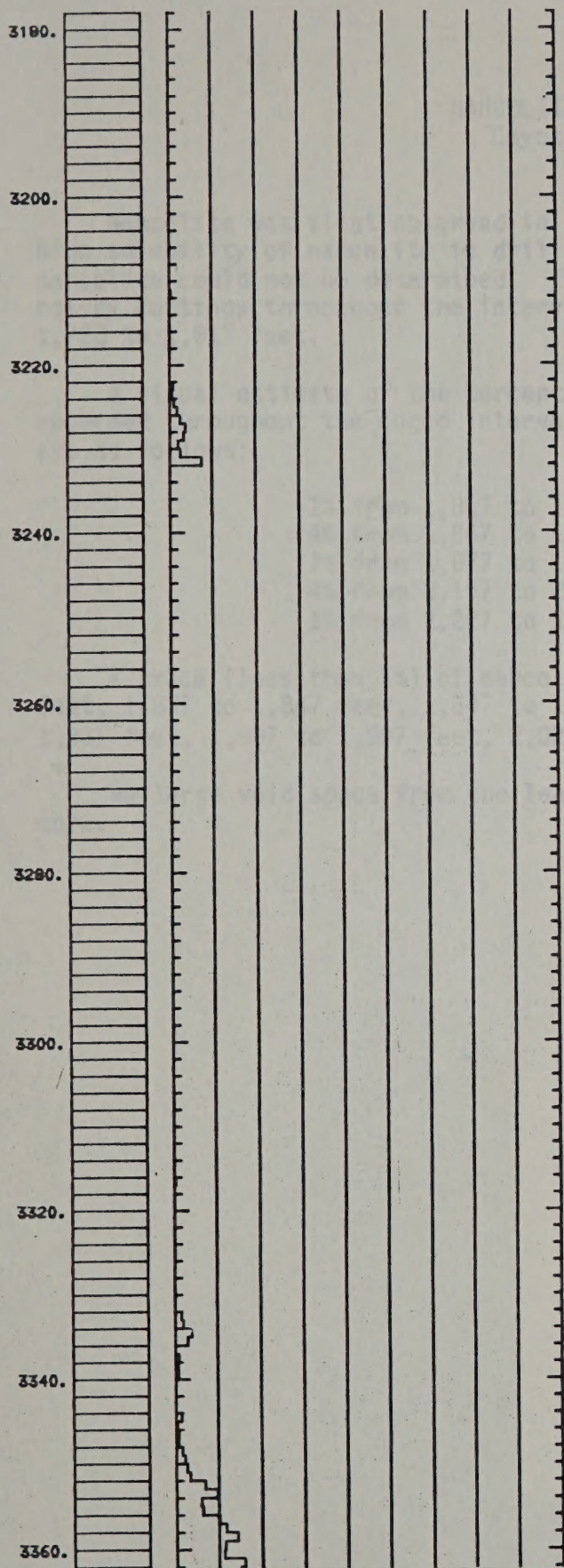


Figure 3: (continued)





NAHCOLITE OCCURRENCE  
Coyote Wash #1

Nahcolite was first observed in the rotary cuttings, but because of the high solubility of nahcolite in drilling fluids, an accurate percentage of nahcolite could not be determined. Evidence of nahcolite was observed in the rotary cuttings throughout the intervals from 1,550 to 1,620 feet and from 1,730 to 1,817 feet.

A visual estimate of the percentage of nahcolite per ten feet of core was recorded throughout the cored interval. The zones of nahcolite mineralization are as follows:

1% from 1,817 to 1,827 feet  
4% from 1,867 to 1,877 feet  
7% from 1,877 to 1,887 feet  
4% from 2,197 to 2,207 feet  
1% from 2,227 to 2,237 feet

A trace (less than 1%) of nahcolite was observed from 1,827 to 1,837 feet, 1,837 to 1,847 feet, 1,847 to 1,857 feet, 1,887 to 1,897 feet, 1,927 to 1,937 feet, 1,987 to 1,997 feet, 2,027 to 2,037 feet, and 2,047 to 2,057 feet

No large void space from the leaching of nahcolite was observed in the core.





